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**Digital cellular telecommunications system (Phase 2+);
Specification of the SIM Application Toolkit for the
Subscriber Identity Module - Mobile Equipment
(SIM - ME) interface
(GSM 11.14 version 8.3.0 Release 1999)**

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MOBILE COMMUNICATIONS



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Foreword

This Technical Specification (TS) has been produced by the Special Mobile Group (SMG).

The present document defines the interface between the Subscriber Identity Module (SIM) and the Mobile Equipment (ME) within the digital cellular telecommunications system.

The contents of the present document are subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of the present document it will then be republished by ETSI with an obligatory change of release date and an increase in version number as follows:

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where:

- 8 indicates GSM Phase 2+ Release 1999.
- x the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc..
- y the third digit is incremented when editorial only changes have been incorporated in the specification.

1 Scope

The present document defines the interface between the Subscriber Identity Module (SIM) and the Mobile Equipment (ME), and mandatory ME procedures, specifically for "SIM Application Toolkit".

SIM Application Toolkit is a set of commands and procedures for use during the network operation phase of GSM, in addition to those defined in GSM 11.11 [20].

Specifying the interface is to ensure interoperability between a SIM and an ME independently of the respective manufacturers and operators. The concept of a split of the Mobile Station (MS) into these elements as well as the distinction between the GSM network operation phase, which is also called GSM operations, and the administrative management phase are described in GSM 02.17 [3].

The present document defines:

- the commands;
- the application protocol;
- the mandatory requirements on the SIM and ME for each procedure.

Unless otherwise stated, references to GSM also apply to DCS 1800.

The present document does not specify any aspects related to the administrative management phase. Any internal technical realization of either the SIM or the ME are only specified where these reflect over the interface. This standard does not specify any of the security algorithms which may be used.

The present document defines an enhancement for GSM Phase 2+ of the SIM/ME interface for GSM Phase 2. While all attempts have been made to maintain phase compatibility, any issues that specifically relate to Phase 1 should be referenced from within the relevant Phase 1 specification.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1999 document, references to GSM documents are for Release 1999 versions (version 8.x.y).

- [1] GSM 01.02: "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".
- [2] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [3] GSM 02.17: "Digital cellular telecommunications system (Phase 2+); Subscriber Identity Modules (SIM) Functional characteristics".
- [4] GSM 02.30: "Digital cellular telecommunications system (Phase 2+); Man-Machine Interface (MMI) of the Mobile Station (MS)".
- [5] GSM 03.38: "Digital cellular telecommunications system (Phase 2+); Alphabets and language-specific information".

- [6] GSM 03.40: "Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS) Point-to-Point (PP)".
- [7] GSM 03.41: "Digital cellular telecommunications system (Phase 2+); Technical realization of Short Message Service Cell Broadcast (SMSCB)".
- [8] GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".
- [9] GSM 04.11: "Digital cellular telecommunications system (Phase 2+); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [10] GSM 04.80: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification: Formats and coding".
- [11] GSM 04.90: "Digital cellular telecommunications system (Phase 2+); Unstructured Supplementary Service Data (USSD) - Stage 3".
- [12] GSM 07.05: "Digital cellular telecommunications system (Phase 2+); Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".
- [13] GSM 09.91: "Digital cellular telecommunications system; Interworking aspects of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface between Phase 1 and Phase 2".
- [14] Not used.
- [15] CCITT Recommendation E.164: "Numbering plan for the ISDN era".
- [16] ISO/IEC 7816-3 (1997): "Identification cards - Integrated circuit(s) cards with contacts. Part 3: Electronic signals and transmission protocols".
- [17] ISO/IEC 7816-6 (1995): "Identification cards - Integrated circuit(s) cards with contacts. Part 6 Inter-industry data elements".
- [18] GSM 02.40: "Digital cellular telecommunications system (Phase 2+); Procedures for call progress indications".
- [19] GSM 02.07: "Digital cellular telecommunications system (Phase 2+); Mobile Stations (MS) features".
- [20] GSM 11.11: "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".
- [21] GSM 11.12: "Digital cellular telecommunications system (Phase 2); Specification of the 3 Volt Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".
- [22] GSM 03.22: "Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode".
- [23] GSM 04.07: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3; General aspects".
- [24] GSM 03.48: "Digital cellular telecommunications system (Phase 2+); Security Mechanisms for the SIM application toolkit".
- [25] ISO/IEC 7816-4 (1995): "Identification cards - Integrated circuit(s) cards with contacts. Part 4: Inter-industry commands for interchange".
- [26] GSM 02.42: "Digital cellular telecommunications system (Phase 2+); Network identity and timezone; Service description; Stage 1".
- [27] GSM 07.07: "Digital cellular telecommunications system (Phase 2+); AT command set for GSM Mobile Equipment (ME)".

- [28] GSM 03.22: "Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".
- [29] ISO 639 (1988): "Code for the representation of names of languages".
- [30] 3G TS 23.040: "Technical realization of the Short Message Service (SMS); Point-to-Point (PP)".
- [31] GSM 02.02: "Digital cellular telecommunication system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".
- [32] IETF RFC 1738: "Uniform Resource Locators (URL) : T. Berners-Lee, et al., December 1994.
- [33] IETF RFC 768 "User Datagram Protocol (UDP)".
- [34] IETF RFC 793 "Transmission Control Protocol (TCP)".

3 Definitions, abbreviations and symbols

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply. For further information and definitions refer to GSM 01.02 [1].

application: An application consists of a set of security mechanisms, files, data and protocols (excluding transmission protocols).

application protocol: The set of procedures required by the application.

bearer independent protocol: Mechanism by which the ME provides the SIM with access to the data bearers supported by the ME and the network.

card session: A link between the card and the external world starting with the ATR and ending with a subsequent reset or a deactivation of the card.

card x: Additional card.

card reader x: Electrical interface to support additional card.

data channel: allow the SIM and the network to exchange data using a selected bearer.

data object: Information seen at the interface for which are defined a tag (identifier), a length and a value. Data objects can be either BER-TLV (objects that conform to the Basic Encoding Rules of ASN.1) or SIMPLE-TLV. In this specification, all BER-TLV data objects are "primitive": the value part consists only of SIMPLE-TLV data objects.

link: Radio Resource.

padding: One or more bits appended to a message in order to cause the message to contain the required number of bits or bytes.

proactive SIM: A SIM which is capable of issuing commands to the ME within the T=0 protocol.

proactive SIM session: Sequence of related SIM application toolkit commands and responses. A proactive SIM session starts with the status response '91 xx' (proactive command pending) and ends with a status response of '90 00' (normal ending of command) after Terminal Response.

Rx buffer: A dedicated memory used to temporarily store data to be retrieved.

Service data unit (SDU): In layered systems, a set of data that is sent by a user of the services of a given layer, and is transmitted to a peer service user semantically unchanged. A Protocol Control Information (PCI) header is attached to the Service Data Unit (SDU) by the layer to form a Protocol Data Unit (PDU).

SIM application session: The execution of a sequence of commands internal to the SIM that can result in the performance of one or several proactive SIM sessions. The SIM application session can be started by any event in the card session, and can execute for the duration of the card session. Processing of the SIM application session will not interfere with normal GSM operation.

SIM Application Toolkit: A set of applications and related procedures which may be used during a GSM session.

Tx buffer: A dedicated memory used to temporarily store data to be sent.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply, in addition to those listed in GSM 01.04 [2]:

A3	Algorithm 3, authentication algorithm; used for authenticating the subscriber
A5	Algorithm 5, cipher algorithm; used for enciphering/deciphering data
A8	Algorithm 8, cipher key generator; used to generate K_c
A38	A single algorithm performing the functions of A3 and A8
ADN	Abbreviated Dialling Number
APDU	Application Protocol Data Unit
ATR	Answer To Reset
BCD	Binary Coded Decimal
BDN	Barred Dialling Number
BER	Basic Encoding Rules of ASN.1
C-APDU	Command Application Protocol Data Unit
CB	Cell Broadcast
CBMI	Cell Broadcast Message Identifier
CCP	Capability/Configuration Parameter
CSD	Circuit Switched Data
DCS	Digital Cellular System
DTMF	Dual Tone Multiple Frequency
EF	Elementary File
EGPRS	EDGE General Packet Radio Service
ETSI	European Telecommunications Standards Institute
ctu	elementary time unit
FDN	Fixed Dialling Number
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
ID	Identifier
IEC	International Electrotechnical Commission
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
ISO	International Organization for Standardization
K_c	Cryptographic key; used by the cipher A5
K_i	Subscriber authentication key; the cryptographic key used by the authentication algorithm, A3, and cipher key generator, A8
lgth	The (specific) length of a data unit
LND	Last Number Dialed
ME	Mobile Equipment
MMI	Man Machine Interface
MS	Mobile Station
NMR	Network Measurement Results (see also GSM 04.08 [8])
NPI	Numbering Plan Identifier
PDP	Packet Data Protocol, e.g., Ip or X25 or PPP
PDU	Protocol Data Unit
R-APDU	Response Application Protocol Data Unit
RAND	A RANDom challenge issued by the network
RFU	Reserved for Future Use
SAT	SIM Application Toolkit
SDU	Service Data Unit
SIM	Subscriber Identity Module
SMS	Short Message Service
SRES	Signed RESponse calculated by a SIM
SS	Supplementary Service
SSC	Supplementary Service Control string
SW1/SW2	Status Word 1 / Status Word 2
TCP	Transmission Control Protocol
TE	Terminal Equipment (e.g. an attached personal computer)
TLV	Tag, length, value

TON	Type Of Number
TP	Transfer layer Protocol
TS	Technical Specification
UDP	User Datagram Protocol
UCS2	Universal two byte coded Character Set
URL	Universal Resource Locator
USSD	Unstructured Supplementary Service Data

3.3 Symbols

'0' to '9' and 'A' to 'F' The sixteen hexadecimal digits.

4 Overview of SIM Application Toolkit

The SIM Application Toolkit provides mechanisms which allow applications, existing in the SIM, to interact and operate with any ME which supports the specific mechanism(s) required by the application.

If class "a" is supported, a SIM supporting SIM Application Toolkit shall be able to communicate with the additional card(s) and get information about the additional reader(s) via the ME.

The following mechanisms have been defined. These mechanisms are dependent upon the commands and protocols relevant to SIM Application Toolkit in GSM 11.11 [20].

4.1 Profile Download

Profile downloading provides a mechanism for the ME to tell the SIM what it is capable of. The ME knows what the SIM is capable of through the SIM Service Table and EF_{PHASE}.

4.2 Proactive SIM

Proactive SIM gives a mechanism whereby the SIM can initiate actions to be taken by the ME. These actions include:

- displaying text from the SIM to the ME;
- sending a short message;
- setting up a voice call to a number held by the SIM;
- setting up a data call to a number and bearer capabilities held by the SIM;
- sending a SS control or USSD string;
- playing tone in earpiece;
- initiating a dialogue with the user;
- SIM initialization request and notification of changes to EF(s);
- providing local information from the ME to the SIM;
- communicating with the additional card(s) (if class "a" is supported);
- providing information about the additional card reader(s) (if class "a" is supported);
- managing timers running physically in the ME;
- running an AT command received from the SIM, and returning the result to the SIM (if class "b" is supported);
- sending DTMF;
- requesting the ME to launch the browser corresponding to a URL. (if class "c" is supported);
- establishing and managing a bearer independent protocol (if class "e" is supported).

For each command involved in the dialog with the user, a help information may be available, either for each item of a list of items proposed to the user, or with each command requesting a response from the user. If a proactive command involved in the dialog with the user indicates the availability of the help feature, the support of this feature is optional for the ME.

4.3 Data download to SIM

Data downloading to the SIM uses either dedicated commands (the transport mechanisms of SMS point-to-point and Cell Broadcast) or the Bearer independent protocol. Transferral of information over the SIM-ME interface uses the ENVELOPE command.

4.4 Menu selection

A set of possible menu entries is supplied by the SIM in a proactive SIM command. The menu selection mechanism is used to transfer the SIM application menu item which has been selected by the user to the SIM. The menu selection mechanism may also be used for requesting help information on the items of the SIM application menu.

4.5 Call control by SIM

When this service is activated by the SIM, all dialled digit strings, supplementary service control strings and USSD strings are first passed to the SIM before the ME sets up the call, the supplementary service operation or the USSD operation. The ME shall also pass to the SIM at the same time its current serving cell. The SIM has the ability to allow, bar or modify the call, the supplementary service operation or the USSD operation. The SIM also has the ability to replace a call request, a supplementary service operation or a USSD operation by another call request or supplementary service operation or USSD operation. For example, a call request can be replaced by a supplementary service operation or a USSD operation, and vice-versa.

4.6 MO Short Message control by SIM

When this service is activated by the SIM, all MO short messages are first passed to the SIM before the ME sends the short message. The ME shall also pass to the SIM at the same time its current serving cell. The SIM shall have the ability to allow the sending, bar the sending or modify the destination address of the short message before sending it.

4.7 Event download

A set of events to monitor for is supplied by the SIM in a proactive SIM command. The event download mechanism is used to transfer details of the event to the SIM, when it occurs. Events that the ME can report to the SIM include incoming calls, location status, and availability of the screen for applications.

4.8 Security

Applications designed using the features in this specification may require methods to ensure data confidentiality, data integrity, and data sender validation, or any subset of these. Requirements for these mechanisms are defined in clause 15.

4.9 Multiple card

This subclause applies only if class "a" is supported.

One event and a set of proactive commands are supplied to monitor and control Card x behaviour.

4.10 Timer Expiration

The SIM is able to manage timers running physically in the ME with a proactive command. The Timer Expiration mechanism is used to inform the SIM when a timer expires.

4.11 Bearer Independent Protocol

This subclause applies if class "c" is supported.

The set of proactive commands (OPEN CHANNEL, CLOSE CHANNEL, SEND DATA, RECEIVE DATA and GET CHANNEL STATUS) and events (Data available, Channel status) allows the SIM to establish a data channel with the ME, and through the ME to a remote Server in the Network. The SIM provides information for the ME to select an available bearer at the time of channel establishment. The ME then allows the SIM and the Server to exchange data on this channel, transparently. The SIM uses service of ME lower layer to send data by providing Service Data Unit to ME. The default lower layer is the higher layer of selected bearer.

5 Profile download

5.1 Procedure

The profile download instruction is sent by the ME to the SIM as part of the SIM initialization procedure. This procedure is specified in GSM 11.11 [20]. In this procedure, the ME reads EF_{PHASE}. If EF_{PHASE} indicates that the SIM requires the ME to perform the profile download procedure, then the ME shall, after having performed the CHV1 verification procedure and before selecting EF_{IMSI} or EF_{LOCK}, send the TERMINAL PROFILE command, as specified below, to the SIM. The profile sent by the ME shall state the facilities relevant to SIM Application Toolkit that are supported by the ME.

This procedure is important, as it is by this that the SIM knows what the ME is capable of, and the SIM can then limit its instruction range accordingly. If no command is sent by the ME, the SIM shall assume that the ME does not support SIM Application Toolkit.

5.2 Structure and coding of TERMINAL PROFILE

Direction: ME to SIM

The command header is specified in GSM 11.11 [20].

Command parameters/data:

Description	Section	M/O	Length
Profile	-	M	lgth

- Profile:

Contents: The list of SIM Application Toolkit facilities that are supported by the ME.

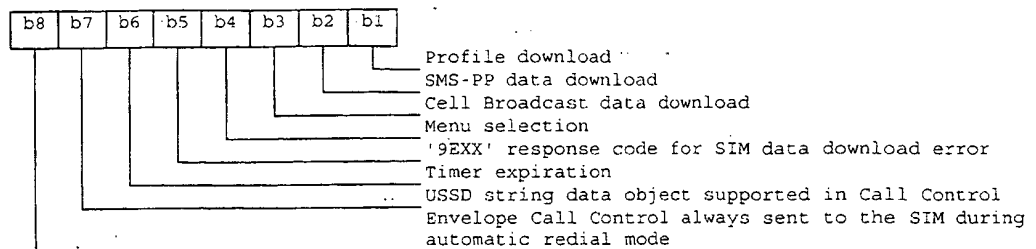
Coding:

1 bit is used to code each facility:

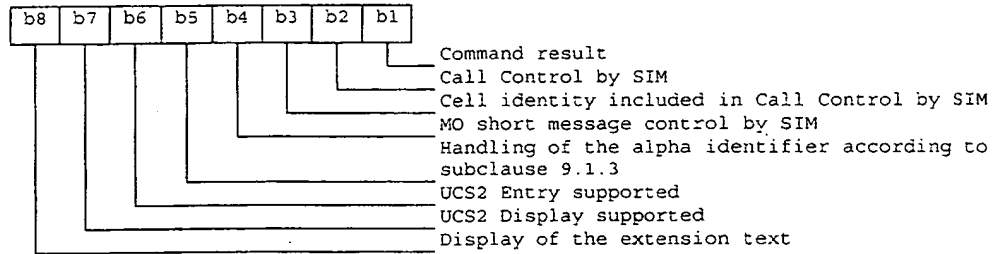
bit = 1: facility supported by ME

bit = 0: facility not supported by ME

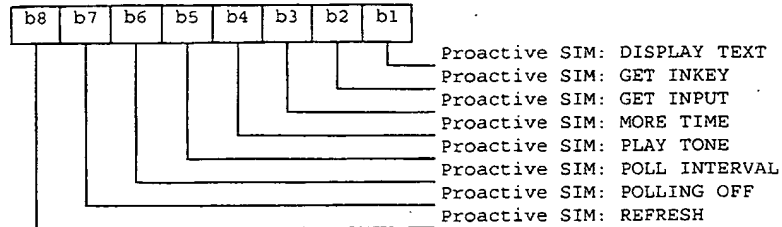
First byte (Download):



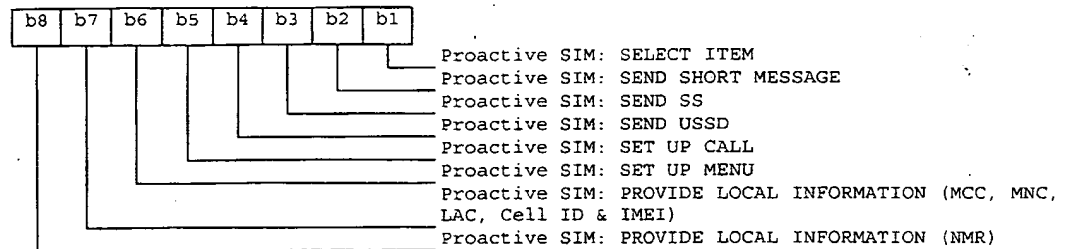
Second byte (Other):



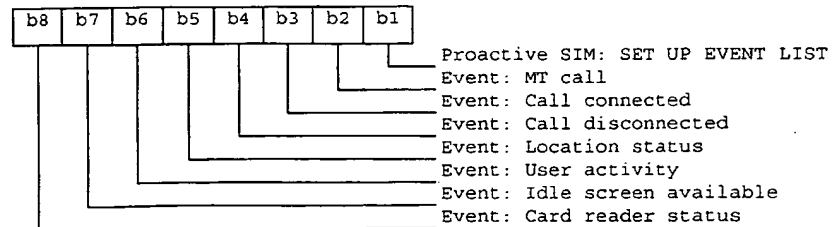
Third byte (Proactive SIM):



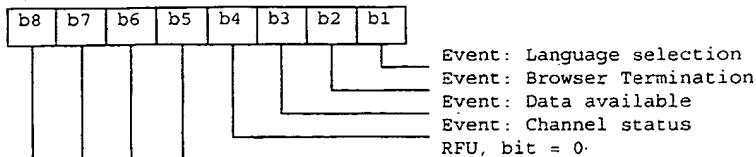
Fourth byte (Proactive SIM):



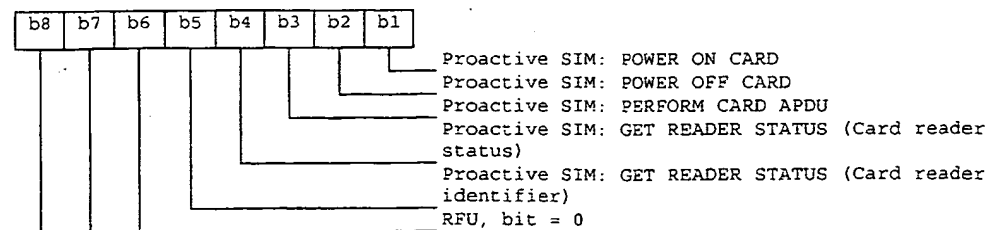
Fifth byte (Event driven information):



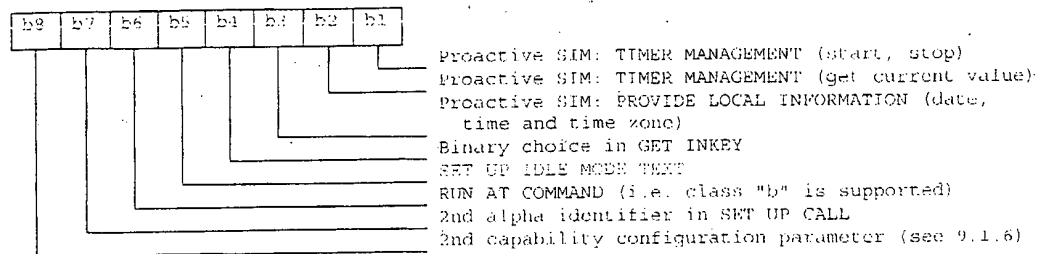
Sixth byte (Event driven information extensions):



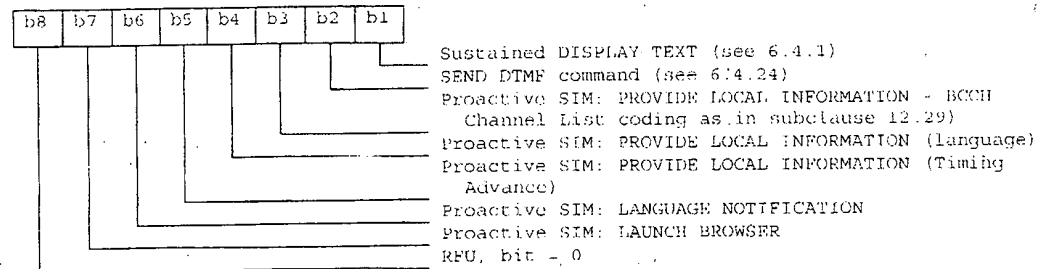
Seventh byte (Multiple card proactive commands) for class "a"



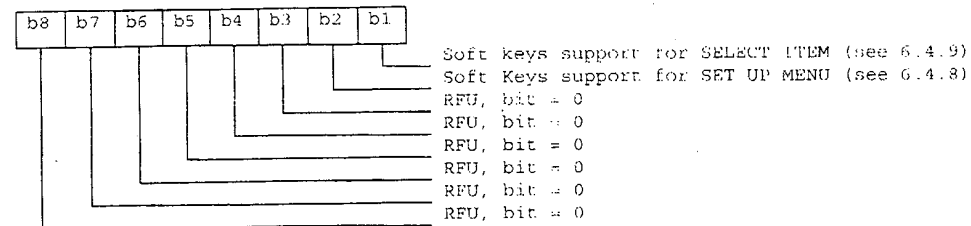
Eighth byte (Proactive SIM):



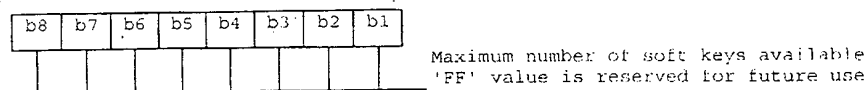
Ninth byte:



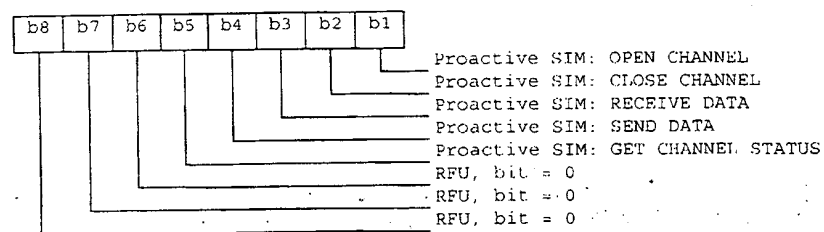
Tenth byte (Soft keys support):



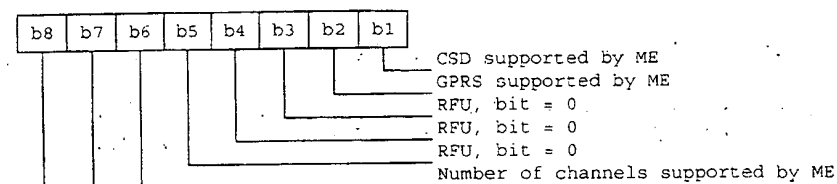
Eleventh byte (Soft keys information):



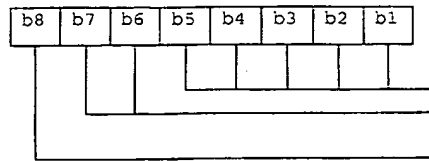
Twelfth byte (Bearer Independent protocol proactive commands (class "c")):



Thirteenth byte (Bearer Independent protocol supported bearers (class "c")):



Fourteenth byte (Screen height):

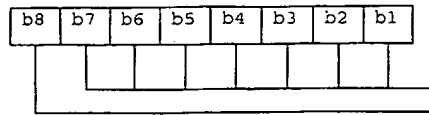


Number of characters supported down the ME display as defined in 5.3.1

RFU, bit = 0

Screen Sizing Parameters supported as defined in section 5.3

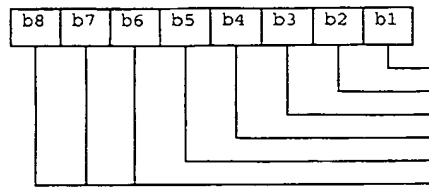
Fifteenth byte (Screen width):



Number of characters supported across the ME display as defined in 5.3.2

Variable size fonts Supported

Sixteenth byte (Screen effects):



Display can be resized as defined in 5.3.3

Text Wrapping supported as defined in 5.3.4

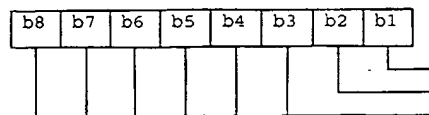
Text Scrolling supported as defined in 5.3.5

RFU

RFU

Width reduction when in a menu as defined in 5.3.6

Seventeenth byte: (Bearer independent protocol supported transport interface) for class "e":

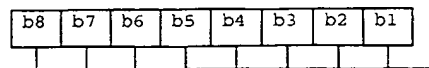


TCP

UDP

RFU, bit = 0

Subsequent bytes:



RFU, bit = 0

RFU bits, and all bits of subsequent bytes, are reserved to indicate future facilities. A SIM supporting only the features of SIM Application Toolkit defined here shall not check the value of RFU bits.

Response parameters/data: None.

5.3 Definition of display parameters in Profile download

This subclause defines the terms used for defining the passing of the ME's screen parameters from the ME to the SIM.

5.3.1 Number of characters supported down the ME display

This is the guaranteed number of characters supported down the ME display without scrolling (using the default character set specified in GSM 03.38 [5]) as a result of a Display Text Proactive command.

If the screen resized as defined in 5.3.3 then this value shall be the initial number of characters supported before the display can be resized.

5.3.2 Number of characters supported across the ME display

This is the guaranteed number of characters supported across the ME display without scrolling (using the default character set specified in GSM 03.38 [5]) as a result of a Display Text Proactive command that can be viewed in one instance.

If the screen resized as defined in 5.3.3 then this value shall be the initial number of characters supported before the display can be resized.

5.3.3 Display can be resized

Display can be resized is supported if either:

- The user can change the number of characters supported across the display, down the display or both.
- The ME can dynamically change the number of characters supported across the display, down the display or both.

5.3.4 Text Wrapping

Text wrapping is supported if the ME puts words that would be split across two lines, due to the display size, at the beginning of the next line down.

5.3.5 Text Scrolling

Text scrolling is supported if the ME scrolls, on one line, words that would be split across two lines, due to the display size.

5.3.6 Width reduction when in a menu

This value is the number of characters available across the display due to a DISPLAY TEXT proactive command without scrolling (using the default character set specified in GSM 03.38 [5]) minus the number of characters available across the display due to a SELECT ITEM proactive command without scrolling (using the default character set specified in GSM 03.38 [5]).

If the screen resized as defined in 5.3.3 then this value shall be calculated using the initial number of characters supported before the display can be resized.

6 Proactive SIM

6.1 Introduction

GSM 11.11 [20] defines that the ME communicates to the SIM using the T=0 protocol, which is specified in ISO/IEC 7816-3 [16]. The ME is always the "master" and initiates commands to the SIM, and therefore there is no mechanism for the SIM to initiate a communication with the ME. This limits the possibility of introducing new SIM features requiring the support of the ME, as the ME needs to know in advance what actions it should take.

The SIM shall execute all SIM Application Toolkit Proactive commands or procedures in such a way as not to jeopardise, or cause suspension, of service provisioning to the user. This could occur if, for example, execution of the RUN GSM ALGORITHM is delayed by internal SIM Toolkit activity, which would result in the network denying or suspending service to the user. Specifically, the MORE TIME command shall be used, whenever possible, to allow the ME access to the GSM functionality of the SIM if Toolkit applications take an unreasonable time to complete execution.

Note: The maximum delay before the sending of a MORE TIME command is required depends on several factors (e.g. the permissible duration of a network-SIM authentication); in some cases a maximal delay of 2 seconds could be required. During this period the NULL procedure byte operation shall be respected as defined in GSM 11.11 [20].

The proactive SIM service provides a mechanism which stays within the protocol of T=0, but adds a new status response word SW1. This status response has the same meaning as the normal ending ('90 00'), and can be used with most of the commands that allow the normal ending, but it also allows the SIM to say to the ME "I have some information to send to you". The ME then uses the FETCH function to find out what this information is.

To avoid cross-phase compatibility problems, these functions shall only be used between a proactive SIM and an ME that supports the proactive SIM feature.

The SIM can issue a variety of commands through this mechanism, given in alphabetical order:

- **CLOSE CHANNEL**, which requests the ME to close the specified data channel (if class "c" is supported).
- **DISPLAY TEXT**, which displays text or an icon on screen. A high priority is available. to replace anything else on screen.
- **GET CHANNEL STATUS**, which requests the ME to return the current status of all available data channel(s) (if class "c" is supported).
- **GET INKEY**, which sends text or an icon to the display and requests a single character response in return. It is intended to allow a dialogue between the SIM and the user, particularly for selecting an option from a menu.
- **GET INPUT**, which sends text or an icon to the display and requests a response in return. It is intended to allow a dialogue between the SIM and the user.
- **GET READER STATUS**, which gives information about the additional reader(s) and inserted card(s) (Card x state, e.g. powered on or not, Card x Presence), if class "a" is supported.
- **LANGUAGE NOTIFICATION**, which allows the SIM to notify the ME about the currently used language in text strings issued by the SIM Application Toolkit application.
- **LAUNCH BROWSER**, which requests a browser inside a browser enabled ME to interpret the content corresponding to a URL.
- **MORE TIME**, which does not request any action from the ME. The ME is required to respond with **TERMINAL RESPONSE (OK)** as normal - see below. The purpose of the **MORE TIME** command is to provide a mechanism for the SIM Application Toolkit task in the SIM to request more processing time.
- **OPEN CHANNEL**, which requests the ME to open a data channel with parameters indicated in the command (if class "c" is supported.)
- **PERFORM CARD APDU**, which requests the ME to send an APDU command to the additional card, if class "a" is supported. This command is compatible with any protocol between the ME and the additional card.
- **PLAY TONE**, which requests the ME to play a tone in its earpiece, ringer, or other appropriate loudspeaker.
- **POLL INTERVAL**, which negotiates how often the ME sends **STATUS** commands to the SIM during idle mode. Polling is disabled with **POLLING OFF**. Use of **STATUS** for the proactive SIM is described in GSM 11.11 [20].
- **POWER OFF CARD**, which closes the session with the additional card, if class "a" is supported.
- **POWER ON CARD**, which initiates a session with the additional card and returns all the ATR bytes, if class "a" is supported.
- **PROVIDE LOCAL INFORMATION** which requests the ME to pass local information to the SIM, for example the mobile country and network codes (MCC + MNC) of the network on which the user is registered.
- **RECEIVE DATA**, which requests the ME to return to the SIM data received on the specified channel (if class "c" is supported).
- **REFRESH**, which requests the ME to carry out a SIM initialization according to GSM 11.11 subclause 12.2.1, and/or advises the ME that the contents or structure of EFs on the SIM have been changed. The command also makes it possible to restart a card session by resetting the SIM.
- **RUN AT COMMAND**, which will convey an AT Command to the ME, and cause the response to the AT Command to be returned to the SIM.
- **SELECT ITEM**, where the SIM supplies a list of items, and the user is expected to choose one. The ME presents the list in an implementation-dependent way.
- **SEND DATA**, which requests the ME to send on the specified channel data provided by the SIM (if class "c" is supported).
- **SEND DTMF**, which requests the ME to send DTMF tone(s) during an established call.

- **SEND SHORT MESSAGE**, which sends a short message or SMS-COMMAND to the network.
- **SEND SS**, which sends an SS request to the network.
- **SEND USSD**, which sends a USSD string to the network.
- **SET UP CALL**, of which there are three types:
 - set up a call, but only if not currently busy on another call;
 - set up a call, putting all other calls (if any) on hold;
 - set up a call, disconnecting all other calls (if any);
- **SET UP EVENT LIST** where the SIM supplies a list of events which it wants the ME to provide details of when these events happen.
- **SET UP IDLE MODE TEXT**, which supplies a text string to be used by the ME as stand-by mode text.
- **SET UP MENU**, where the SIM supplies a list of items to be incorporated into the ME's menu structure.
- **TIMER MANAGEMENT**, which requests the ME to manage a timer in a way described in the command (start, deactivate and get the current value) and, in the case of starting a timer, for a duration indicated in the command.

The ME tells the SIM if the command was successful or not using the command result procedure defined in subclause 6.7. Responsibility for what happens after that (whether to repeat the command, try another one immediately, try again sometime later, or not to try again at all) lies with the SIM application. However, the SIM application needs to know why the command failed, so the ME provides the SIM with the result of the command.

Results are grouped into three main types:

- **OK**.
- **Temporary problem**. These results are further broken down into types of temporary problems, and specific causes. Generally, they indicate to the SIM that it may be worth trying again.
- **Permanent problem**. These results are again further broken down into types of permanent problems, and specific causes. Generally, they indicate to the SIM that it is not worth trying again during this GSM session.

If the SIM issues an instruction to the ME to initiate a Mobile Originated transaction (e.g. SEND SMS, SEND USSD or SEND DTMF), then unless explicitly stated elsewhere in the present document or in GSM 11.11 [14], the content supplied by the SIM for onward transmission by the ME shall not be altered by the ME.

6.2 Identification of proactive SIMs and of ME support

A proactive SIM shall be identified by having the proactive SIM service activated in the SIM Service Table (see GSM 11.11 [20]). An ME that supports proactive SIMs shall be identified as such when it sends a TERMINAL PROFILE command during SIM initialization. The ME shall then send STATUS commands to the SIM at intervals determined by the poll interval procedure (see subclause 6.4.6).

A proactive SIM shall not send any command requests (status bytes SW1 SW2 = '91 XX') to a mobile that does not support the proactive SIM feature.

An ME that supports the proactive SIM feature shall not send proactive SIM related commands to a SIM that does not have the proactive SIM service activated.

6.3 General procedure

For all of the procedures that can end in '90 00' (indicating normal ending to the command), and which cannot end in '9F XX' (response data available from SIM), a proactive SIM operating with an ME that supports proactive SIMs may instead use the status response '91 XX'.

The response code '91 XX' shall indicate to the ME that the previous command has been successfully executed by the SIM in the same way as '90 00' (i.e. "OK"), but additionally it shall indicate response data which contains a command from the SIM for a particular ME procedure (defined in subclause 6.4).

The value 'XX' indicates the length of the response data. The ME shall use the FETCH command to obtain this data.

It is the responsibility of the SIM to remind the ME of a pending proactive command by applying the '91 XX' returncode until it is fetched by the ME.

Note: The last value of 'XX' received in a '91 XX' returncode from the SIM should be used by the ME in a following FETCH command.

It is recommended that the ME interprets a '90 00' following a '91 XX' without a corresponding FETCH as if no proactive command is available in the SIM and regard the proactive SIM session as being terminated. However, the SIM should be able to handle a FETCH command being sent in this case, e.g. by applying the appropriate error handling (cf. "Handling of unknown, unforeseen and erroneous messages").

GSM 11.11 [20] shows how the SIM can initiate a proactive command in each of the five cases of transmission protocol identified in GSM 11.11 [20]. Some commands require the SIM to indicate that it has response data for the ME (through SW1/SW2 = '9F XX'), and the ME gets this data using the GET RESPONSE command.

When the ME has received a command from the SIM, it shall attempt to process the command immediately.

- If the command has been successfully executed, the ME shall inform the SIM as soon as possible, using TERMINAL RESPONSE.
- If the command was not successfully executed, the ME shall inform the SIM as soon as possible using TERMINAL RESPONSE with an error condition.

Responsibility for re-trying lies with the SIM application. The SIM application can make a judgement whether to send the same command again, to send a different one, or not to try again, from the information given by the ME in TERMINAL RESPONSE. If the SIM application wishes the ME to try again, it shall issue a new (identical) command.

Only one proactive command can be ongoing at any one time.

6.4 Proactive SIM commands and procedures

6.4.1 DISPLAY TEXT

This command instructs the ME to display a text message, and/or an icon (see 6.5.4). It allows the SIM to define the priority of that message, and the text string format.

Two types of priority are defined:

- display normal priority text and/or icon on screen;
- display high priority text and/or icon on screen.

The text string can be in one of three formats:

- packed format in SMS default alphabet - (see 12.15.2);
- unpacked format in SMS default alphabet - (see 12.15.2);
- UCS2 alphabet format - (see 12.15.3).

Note: From release 98 onwards the text string may contain up to 240 bytes.

A flag (see command qualifier, subclause 12.6) shall be set to inform the ME whether the availability of the screen for subsequent information display after its use for 'Display Text' should be either after a short delay (the duration of the delay being at the discretion of the ME manufacturer), or following a user MMI action.

An immediate response object may be included by the SIM, to indicate if the ME should sustain the display beyond sending the TERMINAL RESPONSE. ME support of this feature is indicated in the PROFILE DOWNLOAD. The behaviour of non-supporting MEs is dependent on the Comprehension Required flag.

- If the user has indicated the need to end the proactive SIM application session, the ME shall send a TERMINAL RESPONSE with "Proactive SIM application session terminated by the user" result value.

- If the user has indicated the need to go backwards in the proactive SIM application session, the ME shall send a TERMINAL RESPONSE with "Backward move in the proactive SIM session requested by the user" result value.
- If a flag of the command qualifier (see subclause 12.6) indicates that the ME shall wait for the user to clear message and if the ME decides that no user response has been received, the ME shall send a TERMINAL RESPONSE with "No response from user" result value.
- If the SIM includes an immediate response object, the ME shall immediately send TERMINAL RESPONSE (Command performed successfully). The ME shall continue to display the text until one of the following events occurs:
 - a subsequent proactive command is received containing display data;
 - the expiration of the short delay, if so indicated by the command qualifier;
 - following a user MMI action;
 - when a higher priority event occurs, e.g. an incoming mobile terminated call.

No further TERMINAL RESPONSE shall be sent when the ME removes the text from the display, regardless of the cause.

Otherwise, the ME shall send TERMINAL RESPONSE (Command performed successfully) at the expiration of the short delay, or following a user MMI action not described above.

In each case the availability of the screen for the subsequent information display is defined in subclause 6.9.

NOTE 2: For the case where the text is cleared after a short delay, the ME may also allow the user to clear the display via the MMI prior to this.

The ME shall reject normal priority text commands if the screen is currently being used for more than its normal stand-by display. If the command is rejected, the ME informs the SIM using TERMINAL RESPONSE (ME currently unable to process command - screen busy).

High priority text shall be displayed on the screen immediately, except if there is a conflict of priority level of alerting such as incoming calls or a low battery warning. In that situation, the resolution is left to the ME. If the command is rejected in spite of the high priority, the ME shall inform the SIM using TERMINAL RESPONSE (ME currently unable to process command - screen is busy).

If help information is requested by the user, this command may be used to display help information on the screen. The help information should be sent as high priority text and with the option that it should be cleared after a short delay.

6.4.2 GET INKEY

This command instructs the ME to display text and/or an icon (see 6.5.4) and to expect the user to enter a single character. Any response entered by the user shall be passed transparently by the ME to the SIM.

The text can be in one of three formats:

- packed format in SMS default alphabet - (see 12.15.2);
- unpacked format in SMS default alphabet - (see 12.15.2);
- UCS2 alphabet format - (see 12.15.3).

The response can be from one of three character sets. This is specified by the SIM:

- digits only (0-9, *, #, and +);
- characters from the SMS default alphabet;
- characters from the UCS2 alphabet.

Upon receiving the command, the ME shall display the text. The ME shall allow the user to enter a single character in response.

- If the user has indicated the need to go backwards in the proactive SIM session, the ME shall send a TERMINAL RESPONSE with "Backward move in the proactive SIM session requested by the user" result value.
- If the user has indicated the need to end the proactive SIM session, the ME shall send a TERMINAL RESPONSE with "Proactive SIM session terminated by the user" result value.

- If the ME decides that no user response has been received, the ME shall send a TERMINAL RESPONSE with "No response from user" result value.
- If the SIM requests a digit only, the ME shall only allow the user to enter a character from the digits 0-9, *, # and +. When the user has entered a digit, the ME shall pass the entered digit transparently to the SIM, using TERMINAL RESPONSE.
- If help information is available for the command and if the user has indicated the need to get help information, the ME shall send a TERMINAL RESPONSE with "help information required by the user" result value.
- If the SIM requests a character from the SMS default alphabet, the ME shall allow the user to enter a character using characters from this alphabet. When the user has entered a character, the ME shall pass the entered character transparently to the SIM, using TERMINAL RESPONSE.
- If the SIM requests a "Yes/No" response, the ME shall allow the user to enter either a positive or a negative decision using MMI means left to ME manufacturer's choice (keypad, touch screen, softkey,...). The ME may use SEND, ACCEPT or END functions in relation to GET INKEY "Yes/No" response. If used, the SEND and ACCEPT functions as defined in GSM 02.30 [4] shall mean positive decision and the END function as defined in GSM 02.30 [4] shall mean a negative one. Depending on the user's choice, the ME shall pass the positive or a negative value to the SIM, using TERMINAL RESPONSE.

NOTE: If the MMI of the ME requires more than one keypress in order to select a character, it is an implementation decision for the ME manufacturer how to indicate completion (e.g. timeout, pressing SEND, OK). It may be useful to echo the input character on the display.

For digits only (0-9, *, # and +) and SMS default alphabet characters sets, the response shall be coded using the SMS default alphabet in unpacked format.

6.4.3 GET INPUT

This command instructs the ME to display text and/or an icon (see 6.5.4) and that any response string entered by the user shall be passed transparently by the ME to the SIM and shall not be stored in the ME. If the SIM provides a default text, the ME shall display this default text, which the user may accept, reject or edit as the response string.

The text can be in one of three formats:

- packed format in SMS default alphabet (see 12.15.2);
- unpacked format in SMS default alphabet (see 12.15.2);
- UCS2 alphabet format (see 12.15.3).

The SIM indicates how many characters are expected for the response string, by giving a minimum and a maximum acceptable length.

The SIM specifies three variables for the response string it is expecting from the user:

- the response contains either digits only (0-9, *, # and +) or characters from the SMS default alphabet;
- the response for digits only (0-9, *, # and +) or characters from SMS default alphabet is either in an unpacked format or in a packed format;
- the ME may display the text string being entered by the user (the response), or the ME shall hide (i.e. not display) the actual text string.

The combination of characters from the SMS default alphabet and hidden entry mode is not allowed. In hidden entry mode, only digits from the set "0-9", "*" and "#" are allowed for the user input. "+" is not allowed for user input in this mode.

If the SIM requests that the user input (text string) is to be hidden, it is permissible for the ME to indicate the entry of characters, so long as the characters themselves are not revealed.

Upon receiving the command, the ME shall display the text. The ME shall allow the user to enter characters in response.

- The ME MMI is responsible for managing the entry of the correct number of characters.

- If the user has indicated the need to go backwards in the proactive SIM session, the ME shall send a TERMINAL RESPONSE with "Backward move in the proactive SIM session requested by the user" result value.
- If the user has indicated the need to end the proactive SIM session, the ME shall send a TERMINAL RESPONSE with "Proactive SIM session terminated by the user" result value.
- If the ME decides that no user response has been received, the ME shall send a TERMINAL RESPONSE with "No response from user" result value.
- If the SIM requests digits only, the ME shall only allow the user to enter the digits 0-9, *, # and +. When the user has indicated completion, the ME shall pass the entered digit string transparently to the SIM, using TERMINAL RESPONSE.
- If the SIM requests characters from the UCS2 alphabet or SMS default alphabet, the ME shall allow the user to enter a character string using characters from one of these alphabets. When the user has indicated completion, the ME shall pass the entered text string transparently to the SIM, using TERMINAL RESPONSE.
- If help information is available for the command and if the user has indicated the need to get help information, the ME shall send a TERMINAL RESPONSE with 'help information required by the user' result value.

If the SIM requests the user input to be in packed format, then the ME shall pack the text according to GSM 03.38 [5] before submitting it to the SIM.

6.4.4 MORE TIME

This procedure is provided to allow the SIM Application Toolkit task in the SIM more time for processing, where the processing is so long that it is in danger of affecting normal GSM operation, and clock stop prevents processing to take place in the background.

The ME shall take no extraordinary action when it receives this command, and all other operations shall be unaffected. The ME shall conclude the command by sending TERMINAL RESPONSE (OK) to the SIM, as soon as possible after receiving the MORE TIME command.

6.4.5 PLAY TONE

This command instructs the ME to play an audio tone.

Upon receiving this command, the ME shall check if it is currently in, or in the process of setting up (SET-UP message sent to the network, see GSM 04.08 [8]), a speech call.

- If the ME is in, or is setting up a speech call, it shall superimpose the tone on top of the downlink audio (if any), for the duration given in the command. The progress or current state of the call shall not be affected in any way. The ME shall send the TERMINAL RESPONSE (Command performed successfully) as soon as possible after the tone has been completed and, if an alpha identifier was included and displayed, the screen is available for subsequent information display.
- If the ME is not in or setting up a speech call, it shall route the audio to the external ringer, or other appropriate audio device, and play the tone for the duration given in the command. The ME shall send the TERMINAL RESPONSE (Command performed successfully) as soon as possible after the tone has been completed and, if an alpha identifier was included and displayed, the screen is available for subsequent information display.
- If the user has indicated the need to end the proactive SIM application session while the ME plays the tone, the ME shall stop playing the tone and shall send a TERMINAL RESPONSE with "Proactive SIM application session terminated by the user" result value.
- If ME support for the specific tone requested is optional, and the ME does not support this particular tone, the ME shall inform the SIM using TERMINAL RESPONSE (Command beyond ME's capabilities).

⁴This proactive command contains no information on how a call is progressing; therefore the ME shall not generate any verbal indication or display any text or graphical indication about the normal meaning of this tone (e.g. display "called subscriber busy"). If the SIM wishes to convey a meaning in text to the user, it shall do this through the alpha identifier data object and/or an icon (see 6.5.4).

If the ME is required to generate a supervisory tone due to the progress of the current call (e.g. the network sends the ME call control cause information) as defined in GSM 02.40 [18], then the call supervisory tone shall take precedence over the tone requested by the SIM.

6.4.6 POLL INTERVAL

This procedure negotiates how often the ME shall send STATUS commands related to Proactive Polling (defined in GSM 11.11 [20]). The SIM indicates the poll interval it requests from then onwards, and the ME responds through TERMINAL RESPONSE with the maximum interval that it will use. If the ME does not support the poll interval requested by the SIM, then the ME shall respond with the closest interval to the one requested by the SIM, or, if the intervals the ME can offer are equidistant (higher and lower) from the SIM's request, the ME shall respond with the lower interval of the two.

Applications on the SIM should not request short time intervals for an extended period, as this will have an adverse effect on battery life.

6.4.7 REFRESH

The purpose of this command is to enable the ME to be notified of the changes to the SIM configuration that have occurred as the result of a SIM application activity. It is up to the SIM application to ensure that this is done correctly.

The command supports five different modes:

- SIM Initialization. This mode tells the ME to carry out SIM initialization as it is defined in GSM 11.11 subclause 11.6.1 only, starting after the CHV1 verification procedure. The ME shall not reset the SIM electrically.
- File Change Notification. This mode advises the ME of the identity of the EFs that have been changed (in structure and/or contents) in the SIM. This information can be used by the ME if there is an image of SIM EFs (e.g. the ADN file) in the ME's memory, to determine whether it needs to update this image.
- SIM Initialization and File Change Notification. This is a combination of the first two modes above.
- SIM Initialization and Full File Change Notification. This mode causes the ME to perform the SIM initialization procedure of the first mode above and advises the ME that several EFs have been changed (in structure or contents) in the SIM. If there is an image of SIM EFs in the ME's memory, the ME shall completely update this image.
- SIM Reset. This mode causes the ME to run the GSM session termination procedure and to deactivate the SIM in accordance with GSM 11.11 [20]. Subsequently, the ME activates the SIM again and starts a new card session. In case of a 3 Volt technology ME, the ME shall restart the SIM with the same supply voltage as in the previous session, if the ME can ensure that the SIM has not been changed in between. Otherwise, the ME shall perform the supply voltage switching in accordance with GSM 11.12 [21]. The ME shall not send the TERMINAL RESPONSE; this is an exception from the normal procedure, where TERMINAL RESPONSE is sent after completion of the command. The SIM Application shall interpret a new activation of the contacts of the SIM as an implicit TERMINAL RESPONSE. The SIM Reset mode is used when a SIM application requires ATR or complete SIM initialization procedures to be performed. SIM Applications should take into account that early implementations of SIM Application Toolkit in some MEs may send a TERMINAL RESPONSE after performing the REFRESH command involving resetting the SIM electrically.

If the ME performs the REFRESH command successfully for only those EFs indicated in the mode, the ME shall inform the SIM using TERMINAL RESPONSE (OK), after it has completed its refreshing.

For REFRESH commands with mode other than "SIM Reset", it is permissible for the ME, as part of its execution of the REFRESH command, to read EFs in addition to those notified by the SIM, or to perform a SIM initialisation, provided that the procedure executed wholly encompasses the mode requested by the SIM. The ME shall not electrically reset the SIM. If the ME does the refreshing successfully, it shall inform the SIM using TERMINAL RESPONSE (Refresh performed with additional EFs read), after the ME has completed its refreshing. It should be noted that reading additional EFs will lengthen the refresh procedure.

If the ME receives a REFRESH command while in a state where execution of the command would be unacceptable, upsetting the current user operation (e.g. notification during a call that the IMSI has changed), the ME shall inform the SIM using TERMINAL RESPONSE (ME currently unable to process command - currently busy on call) or TERMINAL RESPONSE (ME currently unable to process command - screen is busy) as appropriate.

NOTE: Many MEs copy an image of the SIM's memory to the ME at initialization to speed up access to these fields during a GSM session. One of the purposes of this coding of the REFRESH command is to enable MEs to change such an image efficiently.

If, on receipt of the REFRESH command, the ME replies that it is busy (e.g. in call or navigating menus), the toolkit application may shorten the polling interval utilising the POLL INTERVAL command in order to resend the REFRESH command more frequently.

It is recommended for the ME to minimise the use of sending temporary problem TERMINAL RESPONSE, as during the period between the SIM issuing a REFRESH command and the ME performing the refresh procedure, there may be inconsistencies between data held in the ME and in the SIM. However, responsibility for retrying of all pro-active commands lies with the SIM Application.

6.4.7.1 EF_{IMSI} changing procedure

When EF_{IMSI} is changed via Data Download or a SIM Toolkit application and a REFRESH command is issued by the SIM the following rules apply to the SIM Toolkit and ME:

- SIM Initialization. This command shall not be used if EF_{IMSI} is changed, as the behaviour of the MS is unpredictable.
- File Change Notification. This command shall not be used if EF_{IMSI} is changed, as the behaviour of the MS is unpredictable.
- SIM Initialization and File Change Notification. If EF_{IMSI} is part of the file change notification, the ME shall invoke the MM Restart procedure defined in 03.22 [28].
- SIM Initialization and Full File Change Notification. The ME shall invoke the MM Restart procedure defined in 03.22 [28].
- SIM Reset. Normal SIM Reset procedure is carried out.

If EF_{IMSI} is to be updated, neither EF_{IMSI} nor EF_{LOCK} shall be updated in the SIM before the phase request procedure has been executed by the ME.

6.4.8 SET UP MENU

The SIM shall supply a set of menu items, which shall be integrated with the menu system (or other MMI facility) in order to give the user the opportunity to choose one of these menu items at his own discretion. Each item comprises a short identifier (used to indicate the selection), a text string and optionally an icon identifier, contained in an item icon identifier list data object located at the end of the list of items.

The SIM shall include an alpha identifier, and optionally an icon identifier, which acts as a title for the list of menu items. This icon may be used by the ME to provide an entry into the list of toolkit menu items for the user.

If an icon is provided by the SIM, the icon(s) indicated in the command may be used by the ME in addition to, or instead of the alpha identifier or text string, as indicated with the icon qualifier (see subclause 6.5.4). Additionally, if soft key preferred is indicated in the command details and soft key for SET UP MENU is supported by the ME and the number of icon items does not exceed the number of soft keys available, then the ME shall display those icons as soft key.

The SIM may include an items next action indicator data object located at the end of the list of items. The inclusion of the items next action indicator is to allow the ME to indicate to the user the consequences of performing the selection of an item.

NOTE: The maximum amount of data sent in one proactive SIM command is 256 bytes. It is therefore unavoidable that there is trade-off between the number of items and the length of the descriptive text (the alpha identifier of the SET-UP MENU command and the text strings of the items), e.g. for an average length of 10 bytes per text string the maximum amount of items is 18.

The list of menu items shall then be part of the menu system of the ME and the user is allowed to select an item from this list. The presentation style is left as an implementation decision to the ME manufacturer. However, the ME shall present the menu items in the order given by the SIM, unless instructed otherwise by the user, or when this would be inappropriate for the presentation style of the ME. The menu provided by the SIM in the last SET UP MENU command shall no longer be part of the menu system of the ME if the ME is powered off or the SIM is removed or electrically reset,

Any subsequent SET-UP MENU command replaces the current list of menu items supplied in the previous SET-UP MENU command. The SET-UP MENU command can also be used to remove a menu from the menu system in the ME; see subclause 6.6.7.

When the ME has successfully integrated or removed the list of menu items, it shall send TERMINAL RESPONSE (OK) to the SIM.

When the ME is not able to successfully integrate or remove the list of menu items, it shall send TERMINAL RESPONSE (Command beyond ME's capabilities).

When the user has selected one of the menu items of this menu item list, then the ME shall use the Menu Selection mechanism to transfer the identifier of the selected menu item to the SIM.

If help is available for the command and if the user has indicated the need to get help information on one of the menu items, the ME shall use the Menu Selection mechanism to inform the SIM about this help request.

6.4.9 SELECT ITEM

The SIM shall supply a set of items from which the user may choose one. Each item comprises a short identifier (used to indicate the selection), a text string and optionally an icon identifier, contained in an item icon identifier list data object located at the end of the list of items.

Optionally the SIM may include an alpha identifier, and an icon identifier. These are intended to act as a title for the list of items. The SIM may include an items next action indicator data object located at the end of the list of items. The inclusion of the items next action indicator is to allow the ME to indicate to the user the consequences of performing the selection of an item.

The alpha identifier included by the SIM shall be used by the ME as the title for the list of items.

If an icon is provided by the SIM, the icon(s) indicated in the command may be used by the ME in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4). Additionally, if "selection using soft key preferred" is indicated in the command details and "soft key for SELECT ITEM" is supported by the ME and the number of icons items does not exceed the number of soft keys available, then the ME shall display those icons as soft keys.

NOTE: The maximum amount of data sent in one proactive SIM command is 256 bytes. It is therefore unavoidable that there is trade-off between the number of items and the length of the descriptive text (the alpha identifier of the SELECT ITEM command and the text strings of the items), e.g. for an average length of 10 bytes per text string the maximum amount of items is 18.

The ME shall present the list of text strings to the user, and allow the user to select an item from this list. A flag of the command qualifier (see subclause 12.6) indicates whether the list is a choice of navigation options, or a choice of data values. The presentation style is left as an implementation decision to the ME manufacturer. However, the ME shall present the menu items in the order given by the SIM, unless instructed otherwise by the user, or when this would be inappropriate for the presentation style of the ME.

The SIM may supply with the list, if applicable, indication of the default item, e.g. the previously selected item.

When the user has selected an item, the ME shall send TERMINAL RESPONSE (OK) to the SIM with the identifier of the item chosen.

- If the user has indicated the need to end the proactive SIM session, the ME shall send a TERMINAL RESPONSE with "Proactive SIM session terminated by the user" result value.
- If the user has indicated the need to go backwards in the proactive SIM session, the ME shall send a TERMINAL RESPONSE with "Backward move in the proactive SIM session requested by the user" result value.
- If the ME decides that no user response has been received, the ME shall send a TERMINAL RESPONSE with "No response from user" result value.
- If help information is available for the command and if the user has indicated the need to get help information, the ME shall send a TERMINAL RESPONSE with "help information required by the user" result value to the SIM with the identifier of the item for which the user is requiring help information.

6.4.10 SEND SHORT MESSAGE

Two types are defined:

- a short message to be sent to the network in an SMS-SUBMIT message, or an SMS-COMMAND message, where the user data can be passed transparently;
- a short message to be sent to the network in an SMS-SUBMIT message where the text needs to be packed by the ME.

Where the text has been packed, the text string provided by the SIM shall not be longer than 160 characters. It shall use the SMS default 7-bit coded alphabet, packed into 8-bit octets, in accordance with GSM 03.38 [5]. The data coding indication contained in the Data Coding Scheme byte shall be "default alphabet". The text length (which is part of the SMS TPDU) given by the SIM shall state the number of 7-bit characters in the text string. The command details shall indicate "packing not required".

8-bit data Short Messages may be sent by the SIM. The command shall indicate packing not required. The data coding indication contained in the Data Coding Scheme byte shall be "8 bit". The string shall not be longer than 140 bytes, and the length (in SMS TPDU) shall state the number of bytes in the string.

If UCS2 is supported by the ME, 16-bit data Short Messages may be sent by the SIM. The text string provided by the SIM shall not be longer than 70 characters. It shall use the 16-bit UCS2 alphabet format, in accordance with GSM 03.38 [5]. The text length (which is part of the SMS TPDU) given by the SIM shall state the number of 16-bit characters in the text string. The command details shall indicate "packing not required".

SMS commands may be sent by the SIM. These shall count as packed text message. The SMS TPDU from the SIM shall indicate SMS-COMMAND. The command details shall indicate "packing not required".

Where packing by the ME is required, the text string provided by the SIM shall not be longer than 160 characters. It shall use the SMS default 7-bit coded alphabet as defined in GSM 03.38 [5] with bit 8 set to 0. The text length given by the SIM shall state the number of characters in the text string. The ME shall pack the text string and modify the Data Coding Scheme byte to "default alphabet" in accordance with GSM 03.38 [5] before submitting the message to the network.

Optionally, the SIM may include in this command an alpha identifier. The use of this alpha identifier by the ME is described below.

- If the alpha identifier is provided by the SIM and is not a null data object, the ME shall use it to inform the user. This is also an indication that the ME should not give any other information to the user on the fact that the ME is sending a short message. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).
- If the alpha identifier is provided by the SIM and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the fact that the ME is sending a short message.

- If the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.

If the ME is capable of SMS-MO, then it shall send the data as a Short Message TPDU to the destination address. The ME shall give the result to the SIM using TERMINAL RESPONSE (indicating successful or unsuccessful transmission of the Short Message) after receiving an SMS RP-ACK or RP-Error from the network. If an alpha identifier was provided by the SIM, the ME should not give any information to the user at the reception of SMS RP-ACK or RP-Error.

If the Short Message TPDU is unsuccessfully received by the network (e.g. the reception of a CP-ERROR), the ME shall inform the SIM using TERMINAL RESPONSE (network currently unable to process command). If a null alpha identifier was provided by the SIM, the ME should not give any information to the user at the unsuccessful network reception.

6.4.11 SEND SS

Even if the Fixed Dialling Number service is enabled, the supplementary service control string included in the SEND SS proactive command shall not be checked against those of the FDN list.

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- if the command is rejected because the ME is busy on an SS transaction, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction);
- if the command is rejected because the ME is busy on a USSD transaction, the ME shall inform the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on USSD transaction);
- if the command is rejected because the ME does not support that Supplementary Service, the ME informs the SIM using TERMINAL RESPONSE (Command beyond ME's capabilities).

If the ME is able to send the SS request, the ME shall:

- send the SS request immediately, without need to alert the user first;
- optionally, the SIM may include in this command an alpha-identifier. The use of this alpha-identifier by the ME is described below:
 - if the alpha identifier is provided by the SIM and is not a null data object, the ME shall use it to inform the user. This is also an indication that the ME should not give any other information to the user on the fact that the ME is sending a SS request. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4);
 - if the alpha identifier is provided by the SIM and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the fact that the ME is sending an SS request;
 - if the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.
- once an SS Return Result message not containing an error has been received from the network, the ME shall inform the SIM that the command has been successfully executed, using TERMINAL RESPONSE. This command shall include the contents of SS Return Result as additional data. If a null alpha identifier was provided by the SIM, the ME should not give any information to the user at the reception of an SS Return Result message;
- if the command is rejected because the network cannot support or is not allowing the Supplementary Service request, the ME informs the SIM using TERMINAL RESPONSE (SS Return Result error code). If a null alpha identifier was provided by the SIM, the ME should not give any information to the user at the reception of a SS Return Result message;

- if the SS request is unsuccessfully received by the network, the ME shall inform the SIM using TERMINAL RESPONSE (network currently unable to process command), and not retry to send the request. If a null alpha identifier was provided by the SIM, the ME should not give any information to the user at the reception of a SS Return Result message.

If the ME supports the Last Number Dialed service, the ME shall not store in EF_{LD} the supplementary service control string sent by the SIM in this command.

6.4.12 SEND USSD

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- If the command is rejected because the ME is busy on a USSD transaction, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on USSD transaction);
- If the command is rejected because the ME is busy on a SS transaction, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction).

If the ME is able to send the USSD request, the ME shall:

send the USSD immediately, without need to alert the user first;

optionally, the SIM may include in this command an alpha-identifier. The use of this alpha-identifier by the ME is described below:

If the alpha identifier is provided by the SIM and is not a null data object, the ME shall use it to inform the user. This is also an indication that the ME should not give any other information to the user on the fact that the ME is sending a USSD request. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).

- If the alpha identifier is provided by the SIM and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the fact that the ME is sending a USSD request.
- If the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.
- once the USSD transaction is initiated, a dialogue between the network and the user may occur which involves the MMI of the ME. If an alpha identifier was initially provided by the SIM, this alpha identifier may be discarded during this dialogue;
- once a RELEASE COMPLETE message containing the USSD Return Result message not containing an error has been received from the network, the ME shall inform the SIM that the command has been successfully executed, using TERMINAL RESPONSE. This command shall include the text contained in the USSD Return Result in a Text String data object. If a null alpha identifier was provided by the SIM, the ME should not give any information to the user at the reception of a USSD Return Result message;
- if the MS clears the transaction by sending a RELEASE COMPLETE upon request of the user, the ME shall inform the SIM using TERMINAL RESPONSE (USSD transaction terminated by user);
- if the USSD operation is rejected because the network cannot support or is not allowing mobile initiated USSD, the ME informs the SIM using TERMINAL RESPONSE (USSD Return Result error code). If a null alpha identifier was provided by the SIM, the ME should not give any information to the user at the reception of a USSD Return Result message;
- if the USSD request is unsuccessfully received by the network, the ME shall inform the SIM using TERMINAL RESPONSE (network currently unable to process command), and not retry to send the request. If a null alpha identifier was provided by the SIM, the ME should not give any information to the user at the reception of a USSD Return Result message.

6.4.13 SET UP CALL

Three types are defined:

- set up a call, but only if not currently busy on another call;
- set up a call, putting all other calls (if any) on hold;
- set up a call, disconnecting all other calls (if any) first.

For each of these types, the SIM may request the use of an automatic redial mechanism according to GSM 02.07 [19]. The SIM may also request an optional maximum duration for the redial mechanism. The ME shall attempt at least one call set-up.

In addition to the called party number, the command may contain capability configuration parameters (giving the bearer capability to request for the call) and the called party subaddress. The ME shall use these in its call set-up request to the network. The command may also include DTMF digits, which the ME shall send to the network after the call has connected. The ME shall not locally generate audible DTMF tones and play them to the user.

NOTE: On the downlink audio, DTMF tones reflected by the network may be heard.

It is possible for the SIM to request the ME to set up an emergency call by supplying the number "112" as called party number. If the SIM supplies a number stored in EF_{ECC}, this shall not result in an emergency call.

If the Fixed Dialling Number service is enabled, the number included in the SET UP CALL proactive command shall not be checked against those of the FDN list.

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- If the command is rejected because the ME is busy on another call, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on call);
- If the command is rejected because the ME is busy on a SS transaction, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction);
- If the command is rejected because the ME cannot support Call Hold, or because the ME does not support the capability configuration parameters requested by the SIM, the ME informs the SIM using TERMINAL RESPONSE (Command beyond ME's capabilities);
- If the command is rejected because the network cannot support or is not allowing Call Hold of a multi party call, the ME informs the SIM using TERMINAL RESPONSE (SS Return Result error code).
- If the command is rejected because the network cannot support or is not allowing Call Hold of a single call, the ME informs the SIM using TERMINAL RESPONSE (Network currently unable to process command).

If the ME is able to set up the call on the serving network, the ME shall:

- Alert the user (as for an incoming call). This is the confirmation phase.
- Optionally, the SIM may include in this command an alpha-identifier. The use of this alpha-identifier by the ME is described below :

If Second Alpha Identifier in SET UP CALL is supported by ME:

- If the first alpha identifier is provided by the SIM and is not a null data object, the ME shall use it during the user confirmation phase. This is also an indication that the ME should not give any other information to the user during the user confirmation phase. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).
- If the first alpha identifier is not provided by the SIM or is a null data object (i.e. length = '00' and no value part), the ME may give information to the user.

- If the second alpha identifier (i.e. the one after the mandatory address object) is provided by the SIM and is not a null data object, the ME shall use it during the call set-up phase and during the call. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).
- If the second alpha identifier is not provided by the SIM or is a null data object (i.e. length = '00' and no value part), the ME may give information to the user.

If Second Alpha Identifier in SET UP CALL is not supported by ME:

- If the alpha identifier is provided by the SIM, the ME shall use it to inform the user, at the latest when the user is alerted. The ME may also use it to inform the user during the call set-up. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).
- If the user accepts the call, the ME shall then set up a call to the destination address given in the response data, with the relevant capability configuration parameters and called party subaddress (if provided by the SIM);
- If the user does not accept the call, or rejects the call, then the ME informs the SIM using TERMINAL RESPONSE (user did not accept call set-up request). The operation is aborted;
- If the user has indicated the need to end the proactive SIM session, the ME shall send a TERMINAL RESPONSE with "Proactive SIM session terminated by the user" result value.
- Optionally, during call set-up, the ME can give some audible or display indication concerning what is happening;
- Once a CONNECT message has been received from the network (defined in GSM 04.08), the ME shall inform the SIM that the command has been successfully executed, using TERMINAL RESPONSE. Operation of the call then proceeds as normal.

If the first call set-up attempt is unsuccessful:

- If the SIM did not request redial then the ME shall inform the SIM using TERMINAL RESPONSE (network currently unable to process command), and not redial to set-up the call;
- If the SIM requested redial, then the ME may automatically redial the call (depending on its capability/configuration). In this case, the ME shall not send a command result to the SIM concerning the first or any subsequent failed set-up attempts. If the call set-up has not been successful, and the ME is not going to perform any more redials, or the time elapsed since the first call set-up attempt has exceeded the duration requested by the SIM, then the ME shall inform the SIM using TERMINAL RESPONSE (network currently unable to process command), and the redial mechanism shall be terminated;
- If the user stops the call set-up attempt or the redial mechanism before a result is received from the network, the ME informs the SIM using TERMINAL RESPONSE (user cleared down call before connection or network release).

If the ME supports the Last Number Dialed service, the ME shall not store in E1_{LN} the call set-up details (called party number and associated parameters) sent by the SIM in this command.

6.4.14 POLLING OFF

This command disables the Proactive Polling (defined in GSM 11.11 [20]). SIM Presence Detection (defined in GSM 11.11 [20]) is not affected by this command.

6.4.15 PROVIDE LOCAL INFORMATION

This command requests the ME to send current local information to the SIM. At present, this information is restricted to:

- location information: the mobile country code (MCC), mobile network code (MNC), location area code (LAC) and cell ID of the current serving cell;
- the IMEI of the ME;
- the Network Measurement Results and the BCCH channel list;
- the current date, time and time zone;
- the current ME language setting;
- and the Timing Advance.

The ME shall return the requested local information within a **TERMINAL RESPONSE**. Where location information or Network Measurement Results has been requested and no service is currently available, then the ME shall return **TERMINAL RESPONSE** (ME currently unable to process command - no service). Where location information or Network Measurement Results has been requested and the ME is on limited service (e.g. emergency calls only), the ME shall return the data requested in the **TERMINAL RESPONSE** with the general result (Limited Service).

If the NMR are requested and a call is in progress, the value of all the returned parameters provided by the ME in the response to the command will be valid. The NMR returned when a call is in progress from MEs supporting multiband operation, shall be according to the value of the multiband reporting parameter as defined in GSM 04.08 [8]. If a call is not in progress (i.e. ME is in idle mode) some of the returned parameters (e.g. RXQUAL) may be invalid. In idle mode, MEs supporting multiband operation shall ignore the value of the multiband reporting parameter and the NMR returned shall be as defined in GSM 04.08 [8] when the multiband reporting parameter equals zero.

NOTE 1: When in idle mode, the only information element on which it is possible to rely on is the **RXLEV-FULL-SERVING-CELL**, which contains the value of the received signal strength on the BCCH of the current serving cell.

NOTE 2: Network Measurement Results are defined in GSM 04.08 [8] as Measurement Results.

The ME shall return the current date and time as set by the user. If available, the ME shall also return the time zone known from the network with the **NITZ** feature (see GSM 02.42 [26]). If the time zone information is not available, the ME shall return 'FF' for this element.

If language setting is requested, the ME shall return the currently used language.

If the Timing Advance is requested, the ME shall return the timing advance value that was received from the BTS during the last active dedicated connection (e.g. for call or SMS). Timing advance is defined in GSM 04.08 [8]. An ME supporting the Timing Advance feature shall be able to store the last value of timing advance. In addition to the timing advance value, the ME shall return its current status (i.e. ME is in idle mode or not) in order for the application to be aware of potential misinterpretation of the timing advance value. Caution should be taken if using the Timing Advance value for distance measurement as reflections from the external environment (buildings etc.) may affect the accuracy.

6.4.16 SET UP EVENT LIST

The SIM shall use this command to supply a set of events. This set of events shall become the current list of events for which the ME is to monitor.

Any subsequent **SET UP EVENT LIST** command replaces the current list of events supplied in the previous **SET UP EVENT LIST** command. The **SET UP EVENT LIST** command can also be used to remove the entire list of events current in the ME; see subclause 6.6.16. The list of events provided by the SIM in the last **SET UP EVENT LIST** command shall be removed if the ME is powered off or the SIM is removed or electrically reset.

When the ME has successfully accepted or removed the list of events, it shall send **TERMINAL RESPONSE (OK)** to the SIM.

When the ME is not able to successfully accept or remove the list of events, it shall send **TERMINAL RESPONSE** (Command beyond ME's capabilities).

When one of the events in the current list occurs, then the ME shall use the Event Download mechanism to transfer details of the event to the SIM; see clause 11.

6.4.17 PERFORM CARD APDU

This subclause applies only if class "a" is supported.

This command requests the ME to send an APDU command to the additional card (Card x).

The command includes:

- the additional card reader identifier, which is part of the Device Identities object,
- the APDU command to be performed.

Upon receiving this command, the ME shall decide if it is able to execute the command:

- If the command is rejected because the card reader identity is not valid, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card reader not valid);
- If the command is rejected because the card reader is not present or has been removed, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card reader removed or not present);
- If the command is rejected because the card is not present or has been removed, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card removed or not present);
- If the command is rejected because the card reader is busy, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card reader busy);
- If the command is rejected because the card is not powered on, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card powered off);
- If the command is rejected because the received C-APDU format is not valid, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - C-APDU format error).

If the ME is able to transfer the C-APDU to the addressed card, the ME shall:

- Transfer the C-APDU to the addressed card, through the selected ME- Card x protocol;
- Extract the R-APDU data from the addressed card if so requested by the SIM;
- If the command fails because no response is received from Card x, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card mute);
- If the command fails because of any form of transmission error, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Transmission error);
- If the command fails because the ME does not support the protocol used by Card x, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Protocol not supported).

If the command is performed successfully from a protocol point of view, the ME shall include the R-APDU within the TERMINAL RESPONSE command.

6.4.18 POWER OFF CARD

This subclause applies only if class "a" is supported.

This command requests the ME to close a session with the additional card (Card x).

The command includes the additional card reader identifier, which is part of the Device Identities object.

Upon receiving this command, the ME shall decide if it is able to execute the command:

- If the command is rejected because the card reader identity is not valid, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card reader not valid);
- If the command is rejected because the card reader is not present or has been removed, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error - Card reader removed or not present);

- If the command is rejected because the card is not present or has been removed, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error – Card removed or not present);
- If the command is rejected because the card reader is busy, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error – Card reader busy).

If the ME is able to execute the command, the addressed Card x shall be deactivated according to ISO/IEC 7816-3 [16].

6.4.19 POWER ON CARD

This subclause applies only if class "a" is supported.

This command requests the ME to start a session with the additional card (Card x).

The command includes the additional card reader identifier, which is part of the Device Identities object.

Upon receiving this command, the ME shall decide if it is able to execute the command:

- If the command is rejected because the card reader identity is not valid, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error – Card reader not valid);
- If the command is rejected because the card reader is not present or has been removed, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error – Card reader removed or not present);
- If the command is rejected because the card is not present or has been removed, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error – Card removed or not present);
- If the command is rejected because the card reader is busy, the ME informs the SIM using TERMINAL RESPONSE (MultipleCard command error – Card reader busy).

If the ME is able to execute the command, and the addressed Card x is powered off, the ME shall activate the addressed Card x according to ISO/IEC 7816-3 [16]. If the addressed Card x is already powered on, the ME shall treat the POWER ON CARD command as a warm reset, as defined in ISO/IEC 7816-3 [16].

The ME shall return the Answer To Reset within the TERMINAL RESPONSE command. If no ATR is received, the ME shall inform the SIM using TERMINAL RESPONSE (MultipleCard command error – Card mute).

Application writers are advised that the Card x should not be powered up for longer than necessary due to battery life considerations.

6.4.20 GET READER STATUS

This subclause applies only if class "a" is supported.

This command requests the ME to get information about all interfaces or the indicated interface of additional card reader(s). This information is restricted to :

- card reader status;
- card reader identifier.

The ME shall return the requested information from the interfaces to additional card reader(s) within a TERMINAL RESPONSE command.

6.4.21 TIMER MANAGEMENT

This command requests the ME to manage timers running physically in the ME. The possible actions on timers are defined below :

- start a timer;
- deactivate a timer;
- get the current value of a timer.

The SIM and the ME are able to manage 8 different timers running in parallel. The possible duration of a timer is between 1 second and 24 hours. The resolution of a timer is 1 second. The precision of the returned value can not be relied upon in all cases due to potential ME activities. When the ME is switched off or the SIM is reset, all timers are deactivated in the ME.

For a given timer:

- when the SIM requests the ME to start the timer with a duration, then :
 - the ME shall start the timer with the duration given by the SIM, even if this timer is already running. When a timer is started, it takes the value given by the SIM, and is then decremented. The ME shall inform the SIM that the command has been successfully executed, using TERMINAL RESPONSE (OK).
- when the SIM requests the ME to deactivate the timer, then :
 - if the timer is running, the ME shall deactivate the timer. This prevents the SIM from receiving unnecessary information at the expiration of a timer. The ME shall pass the current value of the timer (i.e. the duration that remains before the timer elapses) to the SIM, using TERMINAL RESPONSE.
 - if the timer is already deactivated, the ME shall inform the SIM using TERMINAL RESPONSE ('action in contradiction with the current timer state').
- when the SIM requests the ME to get the current value of the timer, then :
 - if the timer is running, the ME shall pass the current value of the timer (i.e. the duration that remains before the timer elapses) to the SIM, using TERMINAL RESPONSE.
 - if the timer is deactivated, the ME shall inform the SIM using TERMINAL RESPONSE ('action in contradiction with the current timer state').

When a timer expires (i.e. reaches zero), the ME shall use the Timer Expiration mechanism to transfer the identifier of the timer that has expired and the difference between the time when this transfer occurs and the time when the timer was initially started. The ME shall then deactivate the timer.

6.4.22 SET UP IDLE MODE TEXT

The SIM shall supply a text string, which shall be displayed by the ME as an idle mode text if the ME is able to do it. The presentation style is left as an implementation decision to the ME manufacturer. The idle mode text shall be displayed in a manner that ensures that neither the network name nor the service providers name are affected.

If idle mode text is competing with other information to be displayed on the same area, for instance a CB message, the idle mode text shall be replaced by the other information. It is up to the ME to restore the idle mode text when the other information has no longer to be displayed.

The text shall be removed from the ME's memory and display if either:

- the ME is powered off or;
- the SIM is removed or electrically reset or;
- a RESET command occurs with "initialisation" or "reset".

Any subsequent SET UP IDLE MODE TEXT command replaces the current idle mode text of the previous SET UP IDLE MODE TEXT. The SET UP IDLE MODE TEXT command can also be used to remove an idle mode text from the ME; see subclause 6.6.22.

When the ME has successfully integrated or removed an idle mode text, it shall send TERMINAL RESPONSE (OK) to the SIM.

When the ME is not able to successfully integrate or remove the idle mode text, it shall send TERMINAL RESPONSE "Command beyond ME's capabilities" to the SIM.

6.4.23 RUN AT COMMAND

This subclause applies only if class "b" is supported by the ME and enabled by the subscriber through the ME.

The SIM uses this command to send an AT Command to the ME as though initiated by an attached TE. The ME shall then return an AT Response within a TERMINAL RESPONSE to the SIM.

If this feature is enabled, the SIM uses this command to send an AT Command to the ME as though initiated by an attached TE. The ME shall then return an AT Response within a TERMINAL RESPONSE to the SIM.

If this feature is disabled or the mobile does not support the RUN AT COMMAND, then if the SIM Application Toolkit receives an instruction from the network to issue the command, the SIM Application Toolkit should return an error indication in accordance with the AT Response set (e.g. as indicated in GSM 07.07 [27]) to the network.

Optionally, the SIM may include in this command an alpha identifier. The use of this alpha identifier by the ME is described below:

- if the alpha identifier is provided by the SIM and is not a null data object, the ME shall use it to inform the user. This is also an indication that the ME should not give any other information to the user on the fact that the ME is performing an AT command. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4);
- if the alpha identifier is provided by the SIM and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the fact that the ME is performing an AT command;
- if the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.

6.4.24 SEND DTMF

This command requests the ME to send a DTMF string after a call has been successfully established either by the proactive command SET UP CALL or the user. This command is independant of sending DTMF within the call set up (as defined in the SET UP CALL command) and therefore, can be used at any time during a call.

The ME shall not locally generate audible DTMF tones and play them to the user.

NOTE: On the downlink audio, DTMF tones reflected by the network may be heard.

It shall be possible for the user to deactivate this command.

The sending of a DTMF string applies only to the currently active call.

The TERMINAL RESPONSE indicating that the command has been performed successfully shall be sent after the complete DTMF string has been sent to the network by the ME.

If the command is sent in idle mode, or a call is terminated or put on hold before the complete DTMF string has been sent to the network, the ME shall inform the SIM using TERMINAL RESPONSE '20' with the additional information "Not in speech call".

If the user indicates the need to end the proactive SIM application session whilst the ME is sending the DTMF string, the ME shall stop sending the DTMF string and shall send a TERMINAL RESPONSE with "Proactive SIM application session terminated by the user" result value.

Optionally, the SIM may include in this command an alpha identifier. The use of this alpha identifier by the ME is described below:

- if the alpha identifier is provided by the SIM and is not a null data object, the ME shall use it to inform the user. This is also an indication that the ME should not give any other information to the user on the fact that the ME is performing a SEND DTMF command. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4);
- if the alpha identifier is provided by the SIM and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the fact that the ME is performing a SEND DTMF command.

If the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.

6.4.25 LANGUAGE NOTIFICATION

The SIM shall use this command to notify the ME about the language currently used for any text string within proactive commands or envelope command responses.

The notified language stays valid within the ME until the end of the card session or upon executing another LANGUAGE NOTIFICATION command.

When the Toolkit application is not aware of the current Toolkit application language, no specific language is in use or several languages are in use, the SIM may notify non-specific language. This has the effect of cancelling a previous specific LANGUAGE NOTIFICATION.

Two types of language notification are defined:

- specific, where an additional Language object shall be included by the SIM;
- non-specific, where no Language object shall be included by the SIM.

Regardless of whether the ME recognises the notified language or not, the ME shall send TERMINAL RESPONSE (OK) to the SIM.

The ME may use the language included in LANGUAGE NOTIFICATION as appropriate. For instance, this could be done to avoid a mix of languages in screen displays combining ME MMI and SIM Toolkit originating text strings.

6.4.26 LAUNCH BROWSER

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- if the command is rejected because the browser on the ME is busy or not available, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command – browser unavailable);
- if the command is rejected because the ME is busy on a SS transaction, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command – ME currently unable to process command);
- if the command is rejected because the bearer provided in the command is not available, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command – bearer unavailable).

If the ME is able to execute the command:

- the ME shall inform the SIM that the command has been successfully taken into account, using TERMINAL RESPONSE;
- the SIM shall end the proactive session;
- the ME shall request content using the URL.

If the gateway addresses and/or the bearer objects are present in the command and are non null data objects, then the browser shall use these data to request content using the URL. If the gateway addresses, bearer objects, Provisioning File Reference, Browser Identity or URL are null objects or missing, then the ME shall use the default values, i.e. the provisioning data defined in [32] for example.

The way the ME requests content using the URL is out of the scope of the present document. This is specified in RFC 1738 [32] Annex K for example.

NOTE: There is a maximum size for the URL that can be given in argument of this proactive command.

6.4.27 OPEN CHANNEL

This subclause applies only if class "e" is supported.

Upon receiving this command, the ME shall decide if it is able to execute the command. The SIM shall indicate whether the ME should establish the link immediately or upon receiving the first transmitted data (on demand).

The SIM provides to the ME a list of parameters necessary to establish a link:

The SIM may request the use of an automatic reconnection mechanism according to GSM 02.07 [19]. The SIM may also request an optional maximum duration for the reconnection mechanism. The ME shall attempt at least one link establishment set-up.

The SIM may also request an optional maximum duration for the ME to automatically release the link if no data is exchanged.

If the Fixed Dialling Number service is enabled, the address included in the OPEN CHANNEL proactive command shall not be checked against those of the FDN list.

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- If immediate link establishment is requested and the ME is unable to set-up a channel using the exact parameters provided by the SIM, the ME informs the SIM of the best supported parameters using TERMINAL RESPONSE (Command beyond ME's capabilities). The operation is aborted;
- If immediate link establishment is requested and the ME is unable to set-up the link with the network using the exact parameters provided by the SIM, the ME informs the SIM using TERMINAL RESPONSE (Network currently unable to process command). The operation is aborted;
- If on demand link establishment is requested and the ME is unable to set-up a channel using the exact parameters provided by the SIM, the ME sets up the channel using the best parameters it can support and informs the SIM of the channel identifier and the modified parameters using TERMINAL RESPONSE (Command performed with modification);
- If the command is rejected because the ME has no channel left with the requested bearer capabilities, the ME informs the SIM using TERMINAL RESPONSE (Bearer independent protocol error). The operation is aborted;
- If the user does not accept the channel set-up, the ME informs the SIM using TERMINAL RESPONSE (User did not accept call set-up request). The operation is aborted;
- If the user has indicated the need to end the proactive SIM session, the ME informs the SIM using TERMINAL RESPONSE (Proactive SIM session terminated by the user). The operation is aborted;
- If the command is rejected because the ME is busy on another call, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on call). The operation is aborted;
- If the command is rejected because the ME is busy on a SS transaction, the ME informs the SIM using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction). The operation is aborted;

The ME shall inform the SIM that the command has been successfully executed using TERMINAL RESPONSE:

- If immediate link establishment is requested, the ME allocates buffers, sets up the link and informs the SIM and reports the channel identifier using TERMINAL RESPONSE (Command performed successfully);
- If on demand link establishment is requested, the ME allocates buffers, informs the SIM and reports the channel identifier using TERMINAL RESPONSE (Command performed successfully);

If the ME is able to set up the channel on the serving network, the ME shall:

- Alert the user (as for an incoming call). This is the confirmation phase.
- Optionally, the SIM may include in this command an alpha-identifier. The use of this alpha-identifier by the ME is described below :
 - If the alpha identifier is provided by the SIM and is not a null data object, the ME shall use it during the user confirmation phase. This is also an indication that the ME should not give any other information to the user during the user confirmation phase. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).
 - If the alpha identifier is not provided by the SIM or is a null data object (i.e. length = '00' and no value part), the ME may give information to the user.

If the user accepts the channel, the ME shall then set up a channel:

- If the user does not accept the channel or rejects the channel, then the ME informs the SIM using TERMINAL RESPONSE (user did not accept call set-up request). The operation is aborted;
- If the user has indicated the need to end the proactive SIM session, the ME shall send a TERMINAL RESPONSE with (Proactive SIM session terminated by the user) result value.
- Optionally, during call set-up, the ME can give some audible or display indication concerning what is happening;

If the first link set-up attempt is unsuccessful:

- If the SIM did not request link re-connection then the ME shall inform the SIM using TERMINAL RESPONSE (network currently unable to process command), and not retry to set-up the link;
- If the SIM requested link re-connection, then the ME may automatically retry to set-up the link (depending on its configuration capabilities). In this case, the ME shall not send a command result to the SIM concerning the first or any subsequent failed set-up attempts. If the link set-up has not been successful, and the ME is not going to perform any more re-tries, or the time elapsed since the first link set-up attempt has exceeded the duration requested by the SIM, then the ME shall inform the SIM using TERMINAL RESPONSE (network currently unable to process command), and the re-try mechanism shall be terminated;
- If the user stops the link set-up attempt or the re-try mechanism before a result is received from the network, the ME informs the SIM using TERMINAL RESPONSE (user cleared down call before connection or network release).

If the ME supports the Last Number Dialed service, the ME shall not store in EF_{END} the channel set-up details (called party number and associated parameters) sent by the SIM in this command.

6.4.28 CLOSE CHANNEL

This subclause applies only if class "c" is supported.

This command requests the ME to close the channel corresponding to the Channel identifier.

Upon receiving this command, the ME shall decide if it is able to execute the command:

- If the command is rejected because the channel identifier is not valid, the ME informs the SIM using TERMINAL RESPONSE (Bearer independent protocol error);
- If the command is rejected because the requested channel is in error, the ME informs the SIM using TERMINAL RESPONSE (Bearer independent protocol error);

If the ME is able to process the command:

- the ME shall release the link, discard the remaining data and inform the SIM that the command has been successfully executed, using TERMINAL RESPONSE;
- Optionally, during CLOSE CHANNEL, the ME can give some audible or display indication concerning what is happening. In this intention, the SIM may include in this command an alpha-identifier. The use of this alpha-identifier by the ME is described below:
 - If the alpha identifier is provided by the SIM and is not a null data object, the ME shall use it to indicate the link closing phase. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).
 - If the alpha identifier is not provided by the SIM or is a null data object (i.e. length = '00' and no value part), the ME may give information to the user.

6.4.29 RECEIVE DATA

This subclause applies only if class "c" is supported.

This command requests the ME to return data from a dedicated Channel identifier according to the number of bytes specified by the SIM.

Upon receiving this command, the ME shall return the data available in the Rx buffer corresponding to the Channel identifier. Examples are given below, but the list is not exhaustive:

If the ME is unable to process the command:

- If the command is rejected because the requested channel is already closed the ME informs the SIM using TERMINAL RESPONSE (Bearer independent protocol error);
- If the user has indicated the need to end the proactive SIM session, the ME informs the SIM using TERMINAL RESPONSE (Proactive SIM session terminated by the user).

If the ME is able to process the command:

- If the requested number of bytes is available in the buffer, the ME shall inform the SIM that the command has been successfully executed, using TERMINAL RESPONSE and return the requested data and the number of bytes remaining in the channel buffer (or FF if more than the maximum bytes remains).
- If the requested number of bytes is not yet available in the buffer, the ME shall NOT wait for the requested number of bytes to arrive. The ME shall inform the SIM, using TERMINAL RESPONSE (Command performed with missing information) and returns the data currently available in the channel buffer.
- in the case of structured transmission, the structure of the service data unit received by the ME shall be kept intact and shall be fully respected while receiving. The size of service data unit included in the packet PDU is therefore limited to the maximum size of "channel data" in "receive data" response. The ME shall put only one complete service data unit in RX buffer at one time and wait for the RX buffer to be empty before sending the next user data unit. Then the SIM shall receive all "channel data" in one "receive data" command. The SDU is therefore limited to the maximum size of channel data string in terminal response.
- If the alpha identifier is provided by the SIM, the ME shall use it to inform the user. The ME may also use it to inform the user during data transfer. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).

6.4.30 SEND DATA

This subclause applies only if class "e" is supported.

This command requests the ME to send data through a previously set up data channel corresponding to a dedicated Channel identifier. The SIM informs the ME if the data is :

- to be sent immediately;
- or to be stored in a Tx buffer. Then it is up to the ME to manage the data sending in order to use the bearer in an optimised way.

Upon receiving this command, the ME shall either immediately send data or store provided data into the Tx buffer corresponding to the Channel identifier. Examples are given below, but the list is not exhaustive:

- If the ME is unable to process the command:
 - If the command is rejected because the requested channel is already closed the ME informs the SIM using TERMINAL RESPONSE (Bearer Independent Protocol error);
 - If the command is rejected because the channel is temporarily unavailable the ME informs the SIM using TERMINAL RESPONSE (ME currently unable to process command);
 - If the requested number of bytes of empty space is not yet available in the buffer the ME informs the SIM using TERMINAL RESPONSE (Bearer Independent Protocol error);
 - If the user has indicated the need to end the proactive SIM session, the ME informs the SIM using TERMINAL RESPONSE (Proactive SIM session terminated by the user).

- If the ME is able to process the command:
 - If the requested number of bytes of empty space is available in the buffer the ME shall inform the SIM that the command has been successfully executed, using TERMINAL RESPONSE and return the number of bytes of empty space available in the Tx buffer (or FF if more than 255 bytes are available).
 - in the case of structured transmission, the structure of the service data unit sent by the application shall be kept intact and shall be fully respected while sending. The size of service data unit in the packet PDU is therefore limited to the size of "channel data" in the send data command. The SIM application shall send user data unit in one send data command. Then the ME shall send "channel data" in one packet PDU. The SDU is therefore limited to the maximum size of channel data string in data send command.
 - If the alpha identifier is provided by the SIM, the ME shall use it to inform the user. The ME may also use it to inform the user during data transfer. If an icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see subclause 6.5.4).

6.4.31 GET CHANNEL STATUS

This subclause applies only if class "e" is supported.

This command requests the ME to return a Channel status data object for each dedicated Channel identifier. The ME shall return the requested information concerning the channel(s) within a TERMINAL RESPONSE command.

6.5 Common elements in proactive SIM commands

6.5.1 Command number

The command number is to cater for the future possibility of multiple ongoing commands (i.e. when the SIM issues further commands before receiving the response to the ongoing command). The implications of such multiple ongoing commands have not been elaborated at this stage of the toolkit specification.

Each command issued by a proactive SIM during a GSM session shall have its own command number. Command numbers may take any hexadecimal value between '01' and 'FE'. The command number is held in the command details data object.

The SIM is responsible for assigning the command number.

The ME shall keep a record of the status of each command and its command number, until the ME gives the result of the command to the SIM, using TERMINAL RESPONSE. After this, the ME may erase all internal records concerning this command. The command number is then free for allocation by the SIM to a new command.

When the MS is powered off and on, the details of any ongoing command shall be reset. The ME shall not be expected to know the status of commands issued in a previous GSM session.

6.5.2 Device identities

This data object gives the devices which are the source and destination for the instruction. Only certain combinations of source and destination devices are allowed for each proactive command. These are given in clause 14 of this document.

6.5.3 Alpha identifier

Many of the commands include an alpha identifier data object. This is intended to be a short one or two word identifier which shall be displayed on screen by the ME at the same time as the SIM command is performed. If longer text strings are required to be displayed on the screen, the SIM shall send a separate DISPLAY command.

6.5.4 Icon identifiers

Some commands may provide an icon identifier. Icons are intended to enhance the MMI by providing graphical information to the user. The display of icons is optional for the ME. If icons are provided by the SIM, the related alpha identifier or text string shall be present and not a null string.

The SIM indicates to the ME whether the icon replaces an alpha identifier or text string, or whether it accompanies it (see subclause 12.32).

If both an alpha identifier or text string, and an icon are provided with a proactive command, and both are requested to be displayed, but the ME is not able to display both together on the screen, then the alpha identifier or text string takes precedence over the icon.

If the SIM provides an icon identifier with a proactive command, then the ME shall inform the SIM if the icon could not be displayed by sending the general result "Command performed successfully, but requested icon could not be displayed".

If the ME receives an icon and either an empty, or no, alpha identifier/text string is given by the SIM, then the ME shall reject the command with general result "Command data not understood by ME".

NOTE: Application designers should be aware that icons provided by the application may not be displayed by the ME.

6.6 Structure of proactive SIM commands

The general structure of proactive SIM commands using TLV objects is described in annex D.

6.6.1 DISPLAY TEXT

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Text string	12.15	M	Y	C
Icon identifier	12.31	O	N	D
Immediate response	12.43	O	N	E

6.6.2 GET INKEY

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Text string	12.15	M	Y	C
Icon identifier	12.31	O	N	D

Text string

Contents: text for the ME to display in conjunction with asking the user to respond.

6.6.3 GET INPUT

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E+F)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Text string	12.15	M	Y	C
Response length	12.11	M	Y	D
Default Text	12.23	O	N	E
Icon identifier	12.31	O	N	F

- Text string
Contents: text for the ME to display in conjunction with asking the user to respond.
- Response length
Contents: the minimum and maximum acceptable lengths for the response from the user.
- Default Text
Contents: text for the ME to display, corresponds to a default text string offered by the SIM.

6.6.4 MORE TIME

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B

6.6.5 PLAY TONE

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
Tone	12.16	O	N	D
Duration	12.8	O	N	E

Tone

Contents: the standard supervisory tone or proprietary ME tone that the ME shall generate, either on its own or on top of the downlink audio path. If no tone is specified, then the ME shall default to "general beep".

NOTE: Some supervisory tones are optional for mobile equipment (see GSM 02.40 [18]).

- Duration
Contents: the length of time for which the ME shall generate the tone, if the tone is continuous or repeatable. For single tones, the value of this data object shall be ignored by the ME. If no duration is specified, the ME shall default to a duration determined by the ME manufacturer.

6.6.6 POLL INTERVAL

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Duration	12.8	M	Y	C

- Duration

Contents: the maximum interval between two STATUS commands related to Proactive Polling.

6.6.7 SET-UP MENU

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D1+D2+...Dn+E+F+G)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	M	Y	C
Item data object for item 1	12.9	M	Y	D1
Item data object for item 2	12.9	O	N	D2
.....	12.9	O	N	Dx
Item data object for last item in list	12.9	O	N	Dn
Items Next Action Indicator	12.24	O	N	E
Icon identifier	12.31	O	N	F
Item Icon identifier list	12.32	O	N	G

The SET-UP MENU command BER-TLV data object shall contain Item SIMPLE-TLV data objects. Each Item data object contains an item in the list, for the user to choose. The length of each Item data object may be different. Within a list, each Item shall have a unique item identifier.

If the "Item data object for item 1" is a null data object (i.e. length = '00' and no value part), this is an indication to the ME to remove the existing menu from the menu system in the ME.

If the SIM provides an Items Next Action Indicator data object, the comprehension required flag shall be set to '0'.

The SIM may provide a title icon identifier data object and/or an item icon identifier list data object. The item icon identifier data object contains an icon identifier for each item.

6.6.8 SELECT ITEM

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D1+D2+...Dn+E+F+G+H)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
Item data object for item 1	12.9	M	Y	D1
Item data object for item 2	12.9	O	N	D2
.....	12.9	O	N	Dx
Item data object for last item in list	12.9	O	N	Dn
Items Next Action Indicator	12.24	O	N	E
Item Identifier	12.10	O	N	F
Icon identifier	12.31	O	N	G
Item Icon identifier list	12.32	O	N	H

The SELECT ITEM command BER-TLV data object shall contain Item SIMPLE-TLV data objects. Each Item data object contains an item in the list, for the user to choose. The length of each Item data object may be different. Within a list, each Item shall have a unique item identifier. The SELECT ITEM command BER-TLV data object may contain a single Item Identifier data object as an indication of the default item. The Comprehension Required flag in the Item Identifier data object shall be set to 0, indicating that it is not mandatory for the ME to support indication of the default item.

If the SIM provides an Items Next Action Indicator data object, the comprehension required flag shall be set to '0'.

The SIM may provide a title icon identifier data object and/or an item icon identifier list data object. The item icon identifier data object contains an icon identifier for each item.

6.6.9 SEND SHORT MESSAGE

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E+F)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
Address	12.1	O	N	D
SMS TPDU (SMS-SUBMIT or SMS-COMMAND)	12.13	M	Y	E
Icon identifier	12.31	O	N	F

The address data object holds the RP_Destination_Address of the Service Centre. If no RP_Destination_Address is transferred, then the ME shall insert the default Service Centre address.

6.6.10 SEND SS

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
SS string	12.14	M	Y	D
Icon identifier	12.31	O	N	E

6.6.11 SEND USSD

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
USSD String	12.17	M	Y	D
Icon identifier	12.31	O	N	E

6.6.12 SET UP CALL

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E+F+G+H+I+J)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier (user confirmation phase)	12.2	O	N	C
Address	12.1	M	Y	D
Capability configuration parameters	12.4	O	N	E
Called party subaddress	12.3	O	N	F
Duration	12.8	O	N	G
Icon identifier (user confirmation phase)	12.31	O	N	H
Alpha identifier (call set up phase)	12.2	O	N	I
Icon identifier (call set up phase)	12.31	O	N	J

If the capability configuration parameters are not present, the ME shall assume the call is a speech call.

If the called party subaddress is not present, the ME shall not provide a called party subaddress to the network.

If the duration is not present, the SIM imposes no restrictions on the ME of the maximum duration of redials.

6.6.13 REFRESH

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
File List	12.18	M/O	N	C

For the refresh modes "File Change Notification" and "SIM Initialization and File Change Notification", the SIM shall supply a File List data object, indicating which EFs need to be refreshed. For other modes, inclusion of a File List is optional, and the ME shall ignore it.

6.6.14 POLLING OFF

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B

6.6.15 PROVIDE LOCAL INFORMATION

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B

6.6.16 SET UP EVENT LIST

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
Event list	12.25	M	Y	C

If the Event list is a null data object (i.e. length = '00' and no value part), this is an indication to the ME to remove the existing list of events in the ME.

6.6.17 PERFORM CARD APDU

This subclause applies only if class "a" is supported.

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
C-APDU	12.35	M	Y	C

6.6.18 POWER OFF CARD

This subclause applies only if class "a" is supported.

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B

6.6.19 POWER ON CARD

This subclause applies only if class "a" is supported.

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B

6.6.20 GET READER STATUS

This subclause applies only if class "a" is supported.

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B

6.6.21 TIMER MANAGEMENT

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
Timer Identifier	12.37	M	Y	C
Timer value	12.38	M/O	N	D

- Timer Identifier
Contents: identifier of the timer to which the command applies.
- Timer value
Contents: length of time during which the timer has to run. The SIM shall supply this data object only when a timer has to be started.

6.6.22 SET UP IDLE MODE TEXT

Description	Section	M/O	Min	Length
Proactive SIM command Tag	12.2	M	Y	1
Length (A+B+C+D)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Text string	12.15	M	Y	C
Icon identifier	12.31	O	N	D

If the "Text string" is a null data object (i.e. length = '00' and no value part), the ME shall remove the existing idle mode text in the ME.

6.6.23 RUN AT COMMAND

This subclause applies only if class "b" is supported.

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
Alpha Identifier	12.2	O	N	C
AT Command	12.40	M	Y	D
Icon identifier	12.31	O	N	E

6.6.24 SEND DTMF COMMAND

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
Alpha Identifier	12.2	O	N	C
DTMF String	12.44	M	Y	D
Icon identifier	12.31	O	N	E

6.6.25 LANGUAGE NOTIFICATION

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C)	-	M	Y	1
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Language	12.45	M/O	Y/N	C

- Language

Contents: Currently used language. The SIM shall include a Language object, when a specific language is being notified.

6.6.26 LAUNCH BROWSER

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E+F1+ F2+...+FN+G)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
Browser Identity	12.47	O	N	C
URL	12.48	M	Y	D
Bearer	12.49	O	N	E
Provisioning File Reference 1	12.50	O	N	F1
Provisioning File Reference 2	12.50	O	N	F2
Provisioning File Reference N	12.50	O	N	FN
Text String (Gateway/Proxy Identity)	12.15	O	N	G
Alpha identifier (user confirmation phase)	12.2	O	N	H
Icon identifier (user confirmation phase)	12.31	O	N	I

If the URL data object is provisioned the URL value shall take precedence over any other URL value.

If Provisioning File Reference data object is present in the command then it shall take precedence over Bearer and Proxy Identity. If several Provisioning File References are present in the same command the information in the first reference shall take precedence.

Gateway/Proxy Identity is a text string (cf. 12.15) which gives to the mobile the name/identity of the Gateway/Proxy to be used for connecting to the URL.

The ME shall ask the user for confirmation using the Alpha Identifier/Icon Identifier (user confirmation phase) if present, when it receives a LAUNCH BROWSER command which requests the existing browser session connected to a new URL or to terminate a browser session.

6.6.27 OPEN CHANNEL

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E+F+G+H+I+J+K+L+M+N+O+P+Q)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
Icon identifier	12.31	O	N	D
Address	12.1	C	Y	E
Called party subaddress	12.3	O	N	F
Duration 1	12.8	O	N	G
Duration 2	12.8	O	N	H
Bearer description	12.52	M	Y	I
Buffer size	12.55	M	N	J
URL (Access Point address)	12.48	O	N	K
Other address (local address)	12.58	O	N	L
Text String (User login)	12.15	O	N	M
Text String (User password)	12.15	O	N	N
SIM/ME interface transport level	12.59	O	N	O
URL (data destination address)	12.48	C	Y	P
Other address (data destination address)	12.58	C	Y	Q

The Address is requested for CS bearer, for other bearer it is ignored. If the parameter is not present, the mobile uses the default address mobile configuration if any.

The Subaddress may be requested for CS bearer only, for other bearer it is ignored. If the called party subaddress is not present, the ME shall not provide a called party subaddress to the network.

Duration 1 indicates the duration of reconnection tries. If Duration 1 is not present, the SIM imposes no restrictions on the ME.

Duration 2 indicates the timeout value before the ME releases the link if there is no data exchanged on the link. If duration 2 is not present the link is never released automatically by the ME.

The Access point address may be requested for GPRS bearer only. For other bearers, it shall be ignored. The Access point address parameter is a URL (see 12.48) which provides information to the ME necessary to identify the entity which provides interworking with an external network. If the parameter is not present, the mobile may use the default access point address mobile configuration or subscription value.

The local address parameter (see 12.58) provides information to the ME necessary to identify the local device (i.e. it provides an IP address). If local address length is null, dynamic local address is required. If parameter is not present, the mobile may use the mobile default local address configuration.

User login parameter is a text string (see 12.15) which provides information to the ME necessary to answer authentication challenge by supplying access login (e.g. it may provide PPP login). If parameter is not present, the mobile uses default login configuration if any. If no authentication challenge is requested, the user login parameter shall be ignored.

User password parameter is a text string (see 12.15) which provides information to the ME necessary to answer authentication challenge by supplying access password (e.g. it may provide PPP password). If the parameter is not present, the mobile may use the default password configuration if any. If no authentication challenge is requested, the user password parameter shall be ignored.

If the SIM/ME interface transport level is present in the command, then the ME shall provide the requested transport layer protocols under the channel and shall use this object containing a set of parameters required to make the transport connection. If the parameter is not present, the SIM/ME interface is the bearer level (serial link or packet link as AT command defined in TS 27.007 [27]). The data that will be received/sent from the SAT to the transport layer is a SDU that will be received/transmitted in the Transport-PDU.

The Data destination address is the end point destination address of sent data. This data destination address is requested when a SIM/ME interface transport is present, otherwise it is ignored. The data destination address may be a URL or a data network address. If a URL and a data network address is present, the URL shall be ignored.

6.6.28 CLOSE CHANNEL

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
Icon identifier	12.31	O	N	D

6.6.29 RECEIVE DATA

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device Identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
Icon identifier	12.31	O	N	D
Channel data length	12.54	M	Y	E

6.6.30 SEND DATA

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B+C+D+E+F)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B
Alpha identifier	12.2	O	N	C
Icon identifier	12.31	O	N	D
Channel data length	12.54	M	Y	E
Channel data	12.53	M	Y	F

6.6.31 GET CHANNEL STATUS

Description	Section	M/O	Min	Length
Proactive SIM command Tag	13.2	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Command details	12.6	M	Y	A
Device identities	12.7	M	Y	B

6.7 Command results

Once the ME has made its attempt to execute a proactive command from the SIM, the ME shall inform the SIM of the success or otherwise of that command, by using TERMINAL RESPONSE. This message gives the command details, including the number of the command (see subclause 6.5.1), a general result, and sometimes more specific information.

Three overall categories of results are defined:

- Command performed successfully. This is returned by the ME for every successful command;
- Temporary problem with executing command. This is further defined below, but generally these indicate to the SIM that it is worth trying again later;
- Permanent problem with executing command. These are further defined below, but generally indicate that the same command will end in the same result if repeated during the same GSM session.

Successful commands are further defined as:

- Command performed successfully. There were no problems;
- Command performed with partial comprehension. Here the ME receives a command with one or more SIMPLE-TLV data objects that are unrecognized or unexpected, all of which do not have their "comprehension required" flag set (subclause 13.3), but the parent BER-TLV data object still has the minimum set of SIMPLE-TLV data objects required to perform the command;
- Command performed, with missing information. The ME received at least the minimum set of component parts, but did not receive all of the parts that it believed mandatory for the SIM to send;
- Command performed, but modified by call control. This is sent by the ME to indicate that call control modified the type of request indicated in the proactive command, and that the action requested by call control was performed successfully;
- Command performed with modification. This is sent by the ME to indicate that it is unable to process the command using the exact parameters provided by the SIM. The command is processed with the best possible parameters.

Temporary problems are further defined as:

- ME is currently unable to process the command. Specific causes for this are:
 - the screen is busy;
 - ME currently busy on a call;
 - ME currently busy on SEND DTMF operation;
 - ME currently busy on SS transaction;
 - ME currently busy on USSD operation;
 - no service is currently available;
 - access control class barred on serving network;
 - no radio resource currently available;
 - not in speech call.

If none of these can be made to apply, a "no cause can be given" value can be used.

- Network is currently unable to process the command. Specific cause values are the cause values given by the network, as defined in GSM 04.08 [8].
- The user did not accept the call set-up request. This is where the ME alerts the user before setting up a call, and the user either rejected or did not accept the "call".
- The user cleared down the call, before the call connected (CONNECT received from network, as defined in GSM 04.08 [8]) or before the network released the call.
- Action in contradiction with the current timer state. This is where the SIM requests an action for a timer to be taken by the ME and the state of the timer does not allow that action.
- Interaction with call control by SIM, temporary problem. This is sent by the ME to indicate that call control modified the type of request indicated in the proactive command, and that the action requested by call control encounters a temporary problem.

Permanent problems are further defined as:

- Command is beyond ME's capabilities. This is sent by the ME when it understands what the SIM is asking it to do, but does not have the capability to do it, e.g. ME which only supports SMS asked to set up a call.
- Command type not understood by ME. This is sent by the ME when the SIM sends a command with the Type of Command byte set to a value the ME does not know. This is to allow future expansion of commands.
- Command data not understood by ME. This is sent by the ME when the command type is understood by the ME, but the related data object(s) are not, e.g. reserved values have been included in a data object, or one or more unknown SIMPLE-TLV data objects have a "comprehension required" tag.
- SS Return Error. This is given to the SIM when the network returns a SS error in response to a previous SS command. Specific cause values are the same as given by the network in the Return Error message.

- USSD Return Error. This is given to the SIM when the network returns a USSD error in response to a previous USSD command. Specific cause values are the same as given by the network in a Return Error message.
- SMS RP-ERROR. This is given to the SIM when the network returns an error in response to the ME trying to send a short message. Specific cause values are the same as the cause value of RP-Cause in an RP-ERROR message.
- Error, required values are missing. This is given when the command type is understood by the ME, but it does not receive the minimum set of SIMPLE-TLV data objects that it requires to perform the command. These components are shown by the "Min" column in the command structure definitions.
- Interaction with call control by SIM or MO short message control by SIM, permanent problem. This is sent by the ME to indicate that :
 - call control by SIM does not allow the action corresponding to the proactive command or
 - call control by SIM has modified the type of request indicated in the proactive command and that the action requested by call control encounters a permanent problem.

Specific cause values for this are :

- action not allowed;
- the type of request has changed;

If none of these can be made to apply, a "no cause can be given" value can be used.

6.8 Structure of TERMINAL RESPONSE

Direction: ME to SIM

The command header is specified in GSM 11.11 [20]. Length (A+B+C+D+E+F+G+H+I+J+K+L+M+N+P+Q+R+S+T+U+V) is indicated by P3 of the header.

Command parameters/data:

Description	Section	M/O	Min	Length
Command details	12.6	M	Y	A
Device identities	12.7	M	N	B
Result	12.12	M	Y	C
Duration (only required in response to a POLL INTERVAL proactive command)	12.8	M/O	Y/N	D
Text string (only required in response to a GET INKEY or GET INPUT or SEND USSD proactive command)	12.15	M/O	Y/N	E
Item identifier (only required in response to SELECT ITEM proactive command)	12.10	M/O	Y/N	F
Local information (only required in response to PROVIDE LOCAL INFORMATION proactive command)	12.19, 12.20, 12.22, 12.29, 12.39, 12.45 & 12.46	M/O	Y/N	G
Call control requested action (only required if call control by SIM has modified a proactive command SET UP CALL, SEND SS or SEND USSD in another type of request).	12.30	M/O	Y/N	H
Result data object 2 (only required if call control by SIM has modified a proactive command SET UP CALL, SEND SS or SEND USSD in another type of request).	12.12	M/O	Y/N	I
Card reader status (only required in response to GET READER STATUS command). According to the requested information, one Card reader status object for each card interface reported or one Card reader identifier object is required. (only if class "a" is supported)""	12.33, 12.57	M/O	N	J ₀ + ... + J _n or J
Card ATR (only required in response to POWER ON CARD). (only if class "a" is supported)	12.33	M/O	N	K
R-APDU (only required in response to PERFORM CARD APDU). (only if class "a" is supported)	12.36	M/O	N	L
Timer identifier (only required in response to a TIMER MANAGEMENT proactive command)	12.37	M/O	Y/N	M
Timer value (only required in response to a TIMER MANAGEMENT proactive command)	12.38	M/O	Y/N	N
AT Response (only required in response to RUN AT COMMAND proactive command) (only if class "b" is supported)	12.41	M/O	Y/N	P
Text string2 (only required if call control by SIM has modified the proactive command SET UP CALL or SEND SS into a USSD request)	12.15	M/O	Y/N	Q
Channel data (only required in response to RECEIVE DATA) (only if class "e" is supported)	12.53	M/O	Y/N	R

Description	Section	M/O	Min	Length
Channel status (only required in response to GET CHANNEL STATUS or OPEN CHANNEL proactive command) (only if class "e" is supported)	12.56	M/O	Y/N	$S_0 + \dots + S_n$
Channel data length (only required in response to RECEIVE DATA or SEND DATA proactive command) (only if class "e" is supported)	12.54	M/O	Y/N	T
Bearer description (only required in response to OPEN CHANNEL proactive command) (only if class "e" is supported)	12.52	M/O	Y/N	U
Buffer size (only required in response to OPEN CHANNEL proactive command) (only if class "e" is supported)	12.55	M/O	Y/N	V

- Command details: this data object shall be identical to the command details data object (including the comprehension required flag) given by the SIM in the proactive command to which the ME is giving the result.

If the ME has not received a valid Command number, all Command Details object values shall be set to '00' and the Result shall indicate an error.

If the failure is caused by a problem on the transmission layer, the ME shall respond with "temporary problem" ("ME currently not able to process command"). If not, the ME shall respond with "permanent problem" (either "command not understood by ME" or "Error required values are missing").

The SIM shall interpret a Terminal Response with a command number '00' as belonging to the last proactive command having been sent to the ME.

- Device identities: the ME shall set the device identities to:
 Source: ME
 Destination: SIM
- Result: This data object holds the result of the proactive SIM command.
- Duration: When the ME issues a successful TERMINAL RESPONSE for a POLL INTERVAL command, it shall state the polling interval it will be using in the Duration data object. All other types of TERMINAL RESPONSE do not need to include Duration. If one is included by the ME, the SIM shall ignore it.

- Text string: When the ME issues a successful TERMINAL RESPONSE ('0X' result value - refer to subclause 12.12) for a GET INKEY or GET INPUT or SEND USSD command, it shall supply the single character or the character string entered by the user in the Text string data object, or the text returned within the Return Result message from the network for the USSD command, no matter what type of string was entered. All other types of TERMINAL RESPONSE do not need to include Text string. If one is included by the ME, the SIM shall ignore it. When the ME issues a successful TERMINAL RESPONSE ('0X' result value - refer to subclause 12.12) for a GET INKEY ("Yes/No") command with command qualifier set to "Yes/No", it shall supply the value '01' when the answer is "positive" and the value '00' when the answer is "negative" in the Text string data object.

When the ME issues a successful TERMINAL RESPONSE ('0X' result value - refer to subclause 12.12) for a GET INPUT command to which the user has made an empty input (i.e. if the user does not enter any character), the ME shall indicate this by means of either a null text string (see subclause 12.15 for the coding of this object), or by means of a Text string object with Length = '01', and a Value part consisting of a data coding scheme only.

NOTE: The notion of empty input is different from the general result 'no response from user' (see subclause 12.12). The latter event is typically caused by a timeout in the MMI, whereas an empty input requires an acknowledgement from the user.

- Item identifier: When the ME issues a successful TERMINAL RESPONSE ('0X' result value - refer to subclause 12.12) for a SELECT ITEM command, it shall supply the identifier of the item selected by the user in the Item identifier data object. If the ME issues a TERMINAL RESPONSE with result "Help information required by the user" for a SELECT ITEM command, it shall supply the identifier of the item for which the user is requiring help information. All other types of TERMINAL RESPONSE do not need to include Item identifier. If one is included by the ME, the SIM shall ignore it.
- Local information. When the ME issues a successful TERMINAL RESPONSE for a PROVIDE LOCAL INFORMATION command, it shall supply the requested local information.
 - Where the SIM has requested location information, TERMINAL RESPONSE shall contain the location information data object. All other types of TERMINAL RESPONSE do not need to include location information. If one is included by the ME, the SIM shall ignore it.
 - Where the SIM has requested the IMEI, TERMINAL RESPONSE shall contain the IMEI data object. All other types of TERMINAL RESPONSE do not need to include IMEI information. If one is included by the ME, the SIM shall ignore it.
 - Where the SIM has requested the Network Measurement Results the TERMINAL RESPONSE shall contain the NMR data object and the BCCH channel list data object. All other types of TERMINAL RESPONSE do not need to include the NMR information or the BCCH channel list. If one is included by the ME, the SIM shall ignore it.
 - Where the SIM has requested the date, time and time zone the TERMINAL RESPONSE shall contain the Date-Time and Time zone data object. All other types of TERMINAL RESPONSE do not need to include the Date-Time and Time zone information. If one is included by the ME, the SIM shall ignore it.
 - Where the SIM has requested the currently used language, the TERMINAL RESPONSE shall contain the Language data object. All other types of TERMINAL RESPONSE need not to include the Language information. If one is included by the ME, the SIM shall ignore it.
 - Where the SIM has requested the Timing Advance, the TERMINAL RESPONSE shall contain the Timing Advance data object. All other types of TERMINAL RESPONSE do not need to include the Timing Advance information. If one is included by the ME, the SIM shall ignore it.
- Call control requested action. When the ME issues a TERMINAL RESPONSE for a proactive command SET UP CALL, SEND SS or SEND USSD which has been modified by call control by SIM in another type of request, it shall supply the response data given in response to the ENVELOPE (CALL CONTROL).
- Result data object 2. When the ME issues a TERMINAL RESPONSE for a proactive command SET UP CALL, SEND SS or SEND USSD which has been modified by call control by SIM in another type of request, it shall supply the Result data object it would have supplied for the proactive command equivalent to the action requested by call control, and given in the Call control request data element.

- Card reader status (if class "a" is supported). When the ME issues a successful TERMINAL RESPONSE for a CARD READER STATUS command, it shall supply the requested readers information.
 - Where the SIM has requested the card reader status, TERMINAL RESPONSE shall supply the status of each card reader in n consecutive Card reader status data objects, where n is the card reader count. All other types of TERMINAL RESPONSE do not need to include Card reader status. If one is included by the ME, the SIM shall ignore it.
 - Where the SIM has requested the card reader identifier, TERMINAL RESPONSE shall supply the identifier of the requested card reader identifier. All other types of TERMINAL RESPONSE do not need to include Card reader identifier. If one is included by the ME, the SIM shall ignore it.
- ""- Card ATR (if class "a" is supported): When the ME issues a successful TERMINAL RESPONSE for a POWER ON CARD command, it shall supply the ATR returned by the addressed card in the Card ATR data object. All other types of TERMINAL RESPONSE do not need to include Card ATR. If one is included by the ME, the SIM shall ignore it.
- R-APDU (if class "a" is supported): When the ME issues a successful TERMINAL RESPONSE for a PERFORM CARD APDU command, it shall supply the response data and status words in the R-APDU data object. All other types of TERMINAL RESPONSE do not need to include R-APDU. If one is included by the ME, the SIM shall ignore it.
- Timer identifier: When the ME issues a successful TERMINAL RESPONSE for a TIMER MANAGEMENT, it shall state in the timer identifier data object the identifier of the timer to which this command applies. All other types of TERMINAL RESPONSE do not need to include timer identifier data object. If one is included by the ME, the SIM shall ignore it.
- Timer value: When the ME issues a successful TERMINAL RESPONSE for a TIMER MANAGEMENT command with command qualifier indicating 'deactivate' or 'get the current value of the timer', it shall state in the timer value data object the current value of the timer. All other types of TERMINAL RESPONSE do not need to include timer value. If one is included by the ME, the SIM shall ignore it.
- AT Response (if class "b" is supported): When the ME issues a successful TERMINAL RESPONSE for a RUN AT COMMAND command, it shall supply the following information.
 - The TERMINAL RESPONSE shall contain the AT Response (as defined in section 12.40). If the AT Response is included in a TERMINAL RESPONSE to a different command, it shall be ignored by the SIM.
- Text string2: When the ME issues a successful TERMINAL RESPONSE for a proactive command SET UP CALL or SEND SS which has been modified by "call control" by SIM into a USSD request ('05' result value), it shall supply the Text string2. The Text string2 shall contain the text returned within the Return Result message from the network for the USSD response. Text string2 is equivalent to the Text string in the Terminal Response to a SEND USSD command.
- Channel data (if class "c" is supported): When the ME issues a successful TERMINAL RESPONSE for a RECEIVE DATA command it shall supply the following information.
 - The TERMINAL RESPONSE shall contain the Channel data data object (as defined in section 12.53). If this data object is included in a TERMINAL RESPONSE to a different command, it shall be ignored by the SIM.
- Channel status (if class "e" is supported): When the ME issues a successful TERMINAL RESPONSE for a GET CHANNEL STATUS or an OPEN CHANNEL command, it shall supply the following information.
 - In response to a GET CHANNEL STATUS, TERMINAL RESPONSE shall contain as many Channel status data object (as defined in section 12.56) as there are available channel. In response to a OPEN CHANNEL, TERMINAL RESPONSE shall contain a Channel status data object. If this data object is included in a TERMINAL RESPONSE to a different command, it shall be ignored by the SIM.
- Channel data length (if class "e" is supported): When the ME issues a successful TERMINAL RESPONSE for a RECEIVE DATA command or a SEND DATA, it shall supply the following information.
 - The TERMINAL RESPONSE shall contain the Channel data length data object (as defined in section 12.54). If this data object is included in a TERMINAL RESPONSE to a different command, it shall be ignored by the SIM.

- Bearer description (if class "e" is supported): When the ME issues an unsuccessful TERMINAL RESPONSE or a successful TERMINAL RESPONSE for an OPEN CHANNEL command, it shall supply the following information.
- The TERMINAL RESPONSE shall contain the Bearer description data object (as defined in section 12.52). If this data object is included in a TERMINAL RESPONSE to a different command, it shall be ignored by the SIM.
- Buffer size (if class "e" is supported): When the ME issues an unsuccessful TERMINAL or a successful TERMINAL RESPONSE for a OPEN CHANNEL command, it shall supply the following information.
- The TERMINAL RESPONSE shall contain the Buffer size data object (as defined in section 12.55). If this data object is included in a TERMINAL RESPONSE to a different command, it shall be ignored by the SIM.

Under no circumstances shall the SIM wait indefinitely for a TERMINAL RESPONSE.

Any future additional SIMPLE-TLV objects shall be included as Min = N and comprehension not required. This will ensure that any proactive command will end in a predictable way.

Response parameters/data: None.

6.9 Proactive SIM session and ME display interaction

During a proactive session the ME display shall be refreshed by any display data contained in the first and each subsequent proactive command. The refresh shall occur once the ME has retrieved the proactive command using the Fetch instruction, following the proactive command pending status response.

If no proactive command is pending (status response of '90 00' following the Terminal Response), then the session releases the display back into ME control. If this session was terminated in a backwards move, and the session was initiated from an Envelope command containing a Menu Selection, it is recommended that the display returns to the Setup Menu.

If the text is to be sustained, the ME shall display the text of applicable DISPLAY TEXT commands beyond the sending of the TERMINAL RESPONSE and possibly beyond the end of the proactive session.

6.10 Handling of unknown, unforeseen and erroneous messages

6.10.1 General

The procedures described in this subclause apply to the BER-TLV and SIMPLE-TLV data objects described in the present document. The purpose of this subclause is to allow greater flexibility in future versions of this document, and a greater predictability across different versions of this standard.

The procedures described here specify how the ME and SIM shall behave when they receive a proactive command or response that is not fully compliant with the standards by which it was designed. A response will be made to the SIM by means of the "general result" field of the "result"

If the ME sends a FETCH or TERMINAL RESPONSE to the SIM that contains values that the SIM does not understand, then the SIM shall issue the appropriate SW1 / SW2 error response. The current proactive transaction shall be considered complete and neither the ME or the SIM shall take no further action with regard to it. In this case, unless the "General result" is "command performed..." then the SIM shall assume that the command was not carried out and that a permanent error exists with regard to that particular proactive command. If the command was performed, but the "additional information on result" field was not understood, then the SIM may attempt the command again at a later stage in the current GSM session.

If the SIM has enough information to proceed (i.e. it has received all the data objects of the Minimum set) then it shall do so.

6.10.2 Message too short

Any information received that is not a complete tag and length shall be ignored.

6.10.3 Missing minimum information

If a message is received that does not have all the mandatory elements in it, then if all of the minimum set elements are present then the receiver shall complete the command and report "command performed, with missing information".

If the minimum set of elements is not complete, then the ME shall respond with "Error, required values are missing".

6.10.4 Unknown Tag value

If a BER-TLV object is received that has a tag that is understood, but contains SIMPLE-TLV components that have unknown tags, then provided the minimum set condition is fulfilled, the "comprehension required" bit of the tag shall determine how the receiving entity behaves.

If the comprehension required flag in an unknown tag is set to '1', and the ME either does not recognize or is not expecting one or more of the SIMPLE-TLV objects in the message, then it shall respond with "Command data not understood by ME".

If the comprehension required flag is set to '0', then the ME shall read the length field that follows and ignore that object. In this case the ME will be able to carry out the command without the SIMPLE-TLV components that it cannot understand. It shall respond with "command performed with partial comprehension".

6.10.5 Unexpected Tag value

If a BER-TLV object is received that contains elements that have recognisable tags, but which were not expected in the context of this message (for example, the ME sees SMS TDPU tag as part of TEXT FOR DISPLAY), then it shall discard that element. It shall then proceed as described for Unknown Tag values.

If a received object has a tag that has already been received, then the first instance shall be used and any subsequent instances shall be discarded.

6.10.6 Length errors

If the total lengths of the SIMPLE-TLV data objects are not consistent with the length given in the BER-TLV data object, then the whole BER-TLV data object shall be rejected. The result field in the TERMINAL RESPONSE shall have the error condition "Command data not understood by ME".

If the length of the BER-TLV data object is shorter than the length of the response data, the ME shall ignore response data following the complete BER-TLV data object. If the length of the BER-TLV data object is longer than the length of the response data, then sections 6.10.2. and 6.10.3 apply.

6.10.7 Contents not understood

If the contents of a SIMPLE-TLV data object contains a field with a value that is defined as reserved, then the whole SIMPLE-TLV data object shall be considered as invalid. It will then depend on the "comprehension required" bit of the relevant tag as to whether the whole BER-TLV data object shall be rejected, or whether that particular SIMPLE-TLV data object shall be ignored.

If the contents of a BER-TLV object contains RFU bits or bytes, then these shall be ignored.

6.10.8 Extended length data objects

If a SIMPLE-TLV data object has a length longer than expected (i.e. more information has been added), then the receiver shall ignore this extra information to the end of the object. The end of the object shall be found by looking at the "length" field of that object.

NOTE: If comprehension of the extra bytes is required, this can be achieved by the use of a reserved coding in an earlier field.

6.11 Proactive commands versus possible Terminal response

The following table shows for each proactive command the possible terminal response returned (marked by a "•" character).

[illegible]

Terminal response		Proactive Command										
		CARD APDU	POWER ON CARD '31'	POWER OFF CARD '32'	GET READER STATUS '33'	RUN AT COMM- AND '34'	LANG NOTIFI- CATION '35'	OPEN CHANNEL '40'	CLOSE CHANNEL '41'	RECEIVE DATA '42'	SEND DATA '43'	GET CHANNEL STATUS '44'
'00'	Command performed successfully	•	•	•	•	•	•	•	•	•	•	•
'01'	Command performed with partial comprehension	•	•	•	•	•	•	•	•	•	•	•
'02'	Command performed, with missing info	•	•	•	•	•	•	•	•	•	•	•
'03'	REFRESH performed with additional EFs read											
'04'	Command performed successfully, but requested icon could not be displayed							•	•	•	•	•
'05'	Command performed, but modified by call control by SIM											
'06'	Command performed successfully, limited service											
'07'	Command performed with modification							•				
'10'	Proactive SIM session terminated by user							•	•	•	•	•
'11'	Backward move in the proactive SIM session requested by the user											
'12'	No response from user											
'13'	Help information required by the user											
'14'	USSD/ISS Transaction terminated by user							•	•	•	•	•
'20'	ME currently unable to process command	•	•	•	•	•	•	•	•	•	•	•
'21'	Network currently unable to process command							•				
'22'	User did not accept call setup request							•				
'23'	User cleared down call before connection or network release											
'24'	Action in contradiction with the current timer state							•				
'25'	Interaction with call control by SIM, temporary problem							•	•	•	•	•
'26'	Launch Browser generic error											
'30'	Command beyond ME's capabilities	•	•	•	•	•	•	•	•	•	•	•
'31'	Command type not understood by ME	•	•	•	•	•	•	•	•	•	•	•
'32'	Command data not understood by ME	•	•	•	•	•	•	•	•	•	•	•
'33'	Command number not known by ME	•	•	•	•	•	•					
'34'	SS Return Error											
'35'	SMS RPEROR							•	•	•	•	•
'36'	Error, required values are missing	•	•	•	•	•	•					
'37'	USSD return error											
'38'	Multiple Card command error		•	•	•				•	•	•	•
'39'	Interaction with call control by SIM or MO SM control by SIM, permanent problem											
'3A'	Bearer Independent Protocol error											

7 Data download to SIM

7.1 SMS-PP data download

7.1.1 Procedure

If the service "data download via SMS Point-to-point" is allocated and activated in the SIM Service Table (see GSM 11.11 [20]), then the ME shall follow the procedure below:

- When the ME receives a Short Message with:
protocol identifier = SIM data download, and
data coding scheme = class 2 message,

or

when the ME receives a Short Message with:
protocol identifier=ANSI-136 R-DATA (see 3G TS 23.040 [30]) and
data coding scheme = class 2 message, and the ME chooses not to handle the message (e.g. MEs not supporting EGPRS over TIA/EIA-136 do not need to handle the message),

then the ME shall pass the message transparently to the SIM using the ENVELOPE (SMS-PP DOWNLOAD) command as defined below.
- The ME shall not display the message, or alert the user of a short message waiting.
- The ME shall wait for an acknowledgement from the SIM.
- If the SIM responds with '90 00', the ME shall acknowledge the receipt of the short message to the network using an RP-ACK message.
- If the SIM responds with '93 00', the ME shall either retry the command or send back an RP-ERROR message to the network with the TP-FCS value indicating 'SIM Application Toolkit Busy' (see GSM 03.40 [6]).
- If the SIM responds with '9F XX', the ME shall use the GET RESPONSE command to get the response data. The response data from the SIM will be supplied by the ME in the TP-User-Data element of the RP-ACK message it will send back to the network (see GSM 03.40 [6] and GSM 04.11 [9]). The values of protocol identifier and data coding scheme in RP-ACK shall be as in the original message.
- If the SIM responds with '6F XX', the ME shall send back an RP-ERROR message to the network with the TP-FCS value indicating "SIM data download error". The values of protocol identifier and data coding scheme in RP-ERROR shall be as in the original message.

NOTE: The preferred way for a SIM application to indicate a Data Download error is by using the specific code '9E XX' as described in the following bullet point.

- If the ME has indicated in TERMINAL PROFILE that it supports the status word '9E XX' and if the SIM responds with '9E XX', the ME shall use the GET RESPONSE command to get the response data. The response data from the SIM will be supplied by the ME in the TP-User-Data element of the RP-ERROR message it will send back to the network (see GSM 03.40 [6] and GSM 04.11 [9]). The values of protocol identifier and data coding scheme in RP-ERROR shall be as in the original message. The value of the TP-FCS element of the RP-ERROR shall be "SIM data download error".

If the service "data download via SMS-PP" is not allocated and activated in the SIM Service Table, and the ME receives a Short Message with the protocol identifier = SIM data download and data coding scheme = class 2 message, then the ME shall store the message in EF_{SMS} in accordance with GSM 11.11 [20].

NOTE: MEs not supporting SIM Application Toolkit are likely to store data download messages in EF_{SMS}, as if they were normal short messages.

7.1.2 Structure of ENVELOPE (SMS-PP DOWNLOAD)

Direction: ME to SIM

The command header is specified in GSM 11.11 [20].

Command parameters/data:

Description	Section	M/O	Min	Length
SMS-PP download tag	13.1	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Device identities	12.7	M	Y	A
Address	12.1	O	N	B
SMS TPDU (SMS-DELIVER)	12.13	M	Y	C

- Device identities: the ME shall set the device identities to:
 Source: Network
 Destination: SIM
- Address: The address data object holds the RP_Originating_Address of the Service Centre (TS-Service-Centre-Address), as defined in GSM 04.11 [9].

Response parameters/data:

It is permissible for the SIM not to provide response data. If the SIM responds with '90 00' then no response parameter shall be available, otherwise the SIM shall respond with '9F XX' or '9E XX' and the following data is returned:

Byte(s)	Description	Length
1-X (X≤128)	SIM Acknowledgement	X

7.2 Cell Broadcast data download

7.2.1 Procedure

If the service "data download via SMS-CB" is allocated and activated in the SIM Service Table (see GSM 11.11 [20]), then the ME shall follow the procedure below:

- When the ME receives a new Cell Broadcast message, the ME shall compare the message identifier of the Cell Broadcast message with the message identifiers contained in EF_{CBMID}.
- If the message identifier is found in EF_{CBMID}, the cell broadcast page is passed to the SIM using the ENVELOPE (CELL BROADCAST DOWNLOAD) command, defined below. The ME shall not display the message.
- If the message identifier of the incoming cell broadcast message is not found in EF_{CBMID}, then the ME shall determine if the message should be displayed, by following the procedures in GSM 03.41 [7] and GSM 11.11 [20].

The ME shall identify new cell broadcast pages by their message identifier, serial number and page values.

7.2.2 Structure of ENVELOPE (CELL BROADCAST DOWNLOAD)

Direction: ME to SIM

The command header is specified in GSM 11.11 [20].

Command parameters/data:

Description	Section	M/O	Min	Length
Cell Broadcast Download tag	13.1	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Device identities	12.7	M	Y	A
Cell Broadcast page	12.5	M	Y	B

- Device identities: the ME shall set the device identities to:

Source: Network

Destination: SIM

Response parameters/data: None for this type of ENVELOPE command.

8 Menu Selection

A set of possible menu options can be supplied by the SIM using the proactive command SET UP MENU. If the SIM has sent this command, and the user subsequently chooses an option or, the user requests help on it, the ME informs the SIM using this procedure.

8.1 Procedure

If the service "menu selection" is allocated and activated in the SIM Service Table (see GSM 11.11 [20]), then the ME shall follow the procedure below.

- When the ME receives a menu selection from one of the menu items defined by a "SET-UP MENU" command issued previously by the SIM, or the user has indicated the need to get help information on one of these menu items, then it shall pass the identifier of the selected menu item to the SIM using the ENVELOPE (MENU SELECTION) command, as defined below.

8.2 Structure of ENVELOPE (MENU SELECTION)

Direction: ME to SIM

The command header is specified in GSM 11.11 [20].

Command parameters/data:

Description	Section	M/O	Min	Length
Menu Selection tag	13.1	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Device identities	12.7	M	Y	A
Item identifier	12.10	M	Y	B
Help request	12.21	O	N	C

- Device identities: the ME shall set the device identities to:

Source: Keypad

Destination: SIM

- Help request: inclusion of this data object depends upon whether the user actually selected the named menu item or just requested help information on it. If the user actually selected the menu item, this data object shall not be included. If the user indicated the need to get help information on the menu item, this data object shall be included.

Response parameters/data: None for this type of ENVELOPE command.

Coding of byte 4:

- '00' = No further info can be given
 - '01' = Rx buffer full
 - '02' = Rx buffer empty
 - '03' = Tx buffer full
 - '04' = Tx buffer empty
 - '05' = Link dropped
- all other values are reserved for future use

12.57 Card reader identifier

This subclause applies only if class "a" is supported.

Byte(s)	Description	Length
1	Card reader identifier tag	1
2	Length (X)	1
3 to (X+2)	Identifier of card reader	X

Coding :

The identifier of card reader is coded in hexadecimal.

12.58 Other Address

Byte(s)	Description	Length
1	Other address tag	1
2	Length (X)	1
3	Type of address	1
4 to (4 + X-1)	Address	X

A null Local address shall be coded with Length = '00', and no Value part. In that case, the ME shall request a dynamic address.

Coding of Type of address: according to packet data protocol address in GSM 04.08 [8].

- '21' = IPv4 address
- '97' = IPv6 address
- 'others' = reserved

Coding of address: according to packet data protocol address in GSM 04.08 [8].

If type of address indicates IPv4, the Address information in octet 4 to octet 7 contains the IPv4 address. Bit 8 of octet 4 represents the most significant bit of the IP address and bit 1 of octet 7 the least significant bit.

If type of address indicates IPv6, the Address information in octet 4 to octet 19 contains the IPv6 address. Bit 8 of octet 4 represents the most significant bit of the IP address and bit 1 of octet 19 the least significant bit.

12.59 SIM/ME interface transport level

This subclause applies only if class "c" is supported.

Byte(s)	Description	Length
1	SIM/ME interface transport level tag	1
2	Length (X+1)	1
3	Transport protocol type	1
4 to 5	Port number	2

- Transport protocol type coding:
 - '01': UDP (as defined in RFC 768 [33])
 - '02': TCP (as defined in RFC 793 [34])
 - all other value are reserved
- Port number coding: integer

13 Tag values

This clause specifies the tag values used to identify the BER-TLV and SIMPLE-TLV data objects used in this specification.

13.1 BER-TLV tags in ME to SIM direction

Description	Length of tag	Value
SMS-PP download tag	1	'D1'
Cell Broadcast download tag	1	'D2'
Menu Selection tag	1	'D3'
Call control tag	1	'D4'
MO Short message control tag (if (MOSMcontrol is supported)	1	'D5'
Event download tag	1	'D6'
Timer expiration	1	'D7'
Reserved for TIA/EIA-136	1	'DF'

13.2 BER-TLV tags in SIM TO ME direction

Description	Length of tag	Value
Proactive SIM command tag	1	'D0'

13.3 SIMPLE-TLV tags in both directions

8	7	6	5	4	3	2	1
CR	Tag value						

CR: Comprehension required for this object.

Unless otherwise stated, for SIMPLE-TLV data objects it is the responsibility of the SIM application and the ME to decide the value of the CR flag for each data object in a given command.

Handling of the CR flag at the receiving entity is described in subclause 6.10.

CR	Value
Comprehension required	1
Comprehension not required	0

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